AUGUST 10, 1923

THE RUBBER AGE

VOL. XIII. NO. 9

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TABLE OF CONTENTS

NEWS SECTION

Rubber Association Elects New Officers 341
Production Eases Off in Mid-Summer 341
Firestone Cuts Tire Prices? 342
Personnel of Rubber Investigators 342
Regulation of Rubber Belting Proposed 343
Whitaker Resigns as Head of DuBoise Rubber .. 344
Goodrich Statement Shows Increased Sales 345
Import Duties Levied on Rubber Goods 346

FEATURE SECTION

History of Bolton Bias Cutter 347
Father or Suggester? 348
Abrasion Resistance of Vulcanized Rubber 349
Cold Water Hose and Matting Specifications 355

MARKETS

Cottons and Fabrics..... 357
Chemicals and Compounding Ingredients..... 358
Crude, Scrap and Reclaimed Rubber..... 359
Patents, New Incorporations and Trade Marks .. 360

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THE RUBBER AGE

The Only Twice-a-Month Rubber Publication

VOL. XIII. AUGUST 10, 1923 No. 9

RUBBER ASSOCIATION ELECTS NEW OFFICERS

W. O. Rutherford Elected President; G. M. Stadelman, 1st Vice President and C. B. Seger, 2nd Vice President—G. E. Hall Added to Board of Directors.

At a meeting of the Board of Directors of the Rubber Association of America held on July 26, 1923, the following changes in the personnel of the Board and officers of the Association due to resignations and the death of Mr. DeLisser, were made.

The death of Mr. DeLisser and the severance of J. N. Gunn's connection with the United States Tire Company brought about two vacancies. C. B. Seger, Chairman and President of the United States Rubber Company, and George E. Hall, President of the Boston Woven Hose & Rubber Company, were elected to fill these vacancies.

The vacancy in the office of the President of the Association caused by the death of Mr. DeLisser, was filled by the election of W. O. Rutherford, Vice President of The B. F. Goodrich Company and First Vice President of the Association. G. M. Stadelman, President of the Goodyear Tire & Rubber Company and Second Vice President of the Association was elected First Vice President. C. B. Seger, Chairman and President of the United States Rubber Company, was elected Second Vice President.

(Continued on Next Page)

W. O. Rutherford—President

C. B. Seger—2nd Vice President and Member of Board

G. M. Stadelman—1st Vice President

PRODUCTION EASES OFF DURING MID-SUMMER

A Few Tire Manufacturers Have Reduced to Two Shifts while Others are Maintaining Full Production—1923 Business is Reported as Being Favorable

Tire production in Akron is reported to have been cut by 25 per cent, or a slowing up in production of between 25,000 to 30,000 tires a day. Manufacturers are now said to be turning out somewhere between 79,000 and 80,000 tires daily. A strenuous effort is also being made by manufacturers and tire dealers to stimulate sales of tires. It is reported that tire manufacturers are planning a direct-to-consumer sales campaign, the manufacturers permitting the dealers to offer tires at reduced prices.

A number of companies such as Kelly-Springfield, Seiberling, Goodrich, Pennsylvania have closed down for brief breathing spells or reduced their forces as have the National India Rubber Co., Bristol, R. I., and the rubber works of the Goodyear I. R. Glove Co. and the Goodyear M. R. Shoe Co., Boston, Mass. As a result manufacturers have elimin-

(Continued on Page 345)

G. E. Hall—Member of Board

GOODYEAR TO CONSOLIDATE ALL N. Y. CITY DIVISIONS

It was announced on August 1 that the Goodyear Tire and Rubber Company had leased a plot, 100 x 250, at the southwest corner of Fifty-eighth street and Eleventh avenue, New York City and that a six-story building would be started shortly to house the various departments of the company. The crude rubber, export, traffic, warehouse and sales departments will all be consolidated in this building. Direct connection will also be made with the New York Central tracks, thus facilitating carload shipments.

ANOTHER FIRESTONE CUT?

NEW YORK, AUG. 1—As this is being written it is being generally rumored that the Firestone Tire & Rubber Company will make a further cut in tire prices ranging from 3 to 10%. The cut on June 1 was followed by another on June 25 to meet the reductions of other manufacturers. This latest cut, presumably effective today, is said will reduce fabrics 3%; 33 x 3½ Cords, 5%; and 4, 4½ and 5" cords, 10%. No change on Oldfield tires is expected.

New Rubber Company Formed

The Phillips Rubber Co., Boston, Mass., was recently organized with a capital of $50,000, the incorporators being Oliver P. Hussey, Nashua, N. H.; E. Aubrey Murphy, Norfolk; Gladys L. Murphy, Norfolk; C. Harold Baldwin, Lynn; and Hugh J. Shaw, Winthrop.

Connell Goes To Australia

Dennis Connell will become the superintendent of the Melbourne Tire and Rubber Co., Melbourne, Australia. For several years Mr. Connell has been night superintendent of the Fisk Rubber Company's plants, Chicopee Falls, Mass. Connell has been rated as an expert in the manufacture of tires and rubber accessories.

DeLisser Estate $1,000,000

The will of Horace DeLisser, founder of the Ajax Rubber Co. filed in the Surrogate's Court, Mineola, L. I., July 28, revealed the fact that practically all of Mr. DeLisser's estate goes to his widow, Mrs. Ione DeLisser. The estate will probably exceed $1,000,000. Property at Great Neck, L. I. is valued in the petition for probate as "upward of $100,000," and personal property at the same figure.

Fidelity Going West

George McConnell, vice-president and general manager of the Fidelity Tire and Rubber Co., Massilon, O., has announced that the company may soon move to Indianapolis, Ind. Failure of the company officials to come to terms with the owners of the building now occupied is said to be responsible for the decision of the concern to move West. Department heads and some of the workmen will also accompany the company to Indianapolis.

FILIPINOS BOYCOTT AMERICAN TIRES

A boycott against American goods has been started in provinces North of Manila, a Chicago *Tribune* dispatch of July 27 states. It is reported that the people of San Miguel are refusing to buy American made automobiles, tires and gasoline, and are resorting to cart transportation. A member of the San Miguel Municipal Council is urging the people to fall in line with the boycott. Sentiment is high against Governor Woods. Manuel Quezon and Sergio Osmena, Filipino leaders, are awaiting an intimation from President Harding before sailing for the United States in order to lay their grievances personally before Congress at Washington.

Rubber Association Officers

(Continued from Previous Page)

At the meeting of the Board held on June 6th, W. F. Pfeiffer, Vice President of the Miller Rubber Company, Akron, Ohio, was elected a Director in place of J. W. Thomas, Vice President of the Firestone Tire & Rubber Company, on account of the resignation of that company from membership in the association.

In accordance with the By-Laws, the elections to fill these vacancies were made for the balance of the year 1923 only.

Ford, Firestone and Edison Camping Trip

The annual trip of Messrs. Ford, Firestone and Edison will this year take the form of a two weeks camping trip in Michigan or Wisconsin, according to latest advices.

The Edisons will tour alone through western New York, Pennsylvania and into Ohio. At Akron they will be joined by the Firestone party. The four will then tour by easy stages to Detroit, where the Fords will meet them.

The party will travel through the northern Michigan peninsula and the Eagle River district of Wisconsin. Some place in Michigan or Wisconsin—the location of the spot was withheld—the party will camp for two weeks.

Warren Gamaliel Harding

The country is plunged in grief—our beloved President has passed on. A more human, devoted and unselfish public servant the country has never known. We mourn his loss.

***New York, August* 3, 1923.**

PERSONNEL OF RUBBER INVESTIGATORS ANNOUNCED

The Department of Commerce recently announced the personnel of the Caribbean rubber investigating party which sailed from the United States for Panama on July 25 to investigate the rubber plantation possibilities of Panama, Colombia, Venezuela, the Central American countries, and Mexico.

John C. Treadwell of New York, a plantation expert of practical experience, will be in charge of the party. Mr. Treadwell has been connected with the Continental Rubber Company of New York for the past several years. During the period 1914-17 he investigated the rubber planting industry of the Far East for the company. During 1917-22 Mr. Treadwell was vice-president of the Continental Rubber Company and associated companies. For the past year he has been importing crude rubber on his own account.

Hugh H. Bennett of the Bureau of Soils, Department of Agriculture, will accompany Mr. Treadwell as assistant.

Curtis R. Hill of Middleboro, Ohio, and Washington, D. C., formerly connected with the Costa Rica branch of the United Fruit Company, will accompany the party as secreterial assistant.

Starts Production

The Akron Silica-Rubber Co., Akron, O., is preparing to turn out about 1,000 battery boxes a day, an agreement having been made with the Seiberling company to increase this number to 10,000 containers a day. The first carload of silica is on hand, and production is expected to start shortly. The new company was incorporated in May of the current year, while its product is to be known as "Kin-Sil-Ite", a composition of rubber, silica and acids which can be compressed into forms under intense pressure.

Goodrich Starts Resort For Employees

The B. F. Goodrich Co. has established a resort for its employees at Rex Lake, Ohio. Six cottages are maintained there by the company for those who wish to spend their vacations at the company's resort. According to C. Sprague, employment manager, about 800 employees and their friends visit the lake each Sunday. Picnic tables will take care of 200 diners. The company also maintains 12 boats and a baseball diamond. Cottages and other benefits are free to employees.

Lyons Heads Corrugated Rubber

John J. Lyons, secretary of the State of New York during Governor Miller's administration, has been appointed president of the Corrugated Rubber Co., Poughkeepsie, New York. In commenting upon the decision of the board of directors Mr. Lyons said: "I am proud of the honor conferred upon me by the election to the presidency of the Corrugated Company, and I firmly believe that the plant will be hitting on six cylinders not later than October 1 of this year."

CHINA—A GROWING MARKET FOR RUBBER GOODS

There has been a remarkable growth in the value of combined exports of rubber manufactures to China. In 1913 less than $25,000 worth of American rubber goods were sold to the Chinese, whereas in 1920 more than $900,000 in rubber goods were imported. In 1922 the total dropped to $225,046, the reason being that the World wide trade depression was accentuated in China by the enormous drop in the value of silver, which is the basis of the Chinese currency.

According to a monograph recently issued by the Rubber Division, Department of Commerce, tires represent about 80 per cent of all rubber goods imported. There are no statistics showing imports of tires into China by countries, but other information tends to support the fact that the United States and Japan dominate the export trade there. In 1921 Japan exported to China and Kwantung rubber tires valued at $772,000, against exports from the United States of $127,054.

All told there are 7,021 passenger vehicles in China, 437 motor trucks and 792 motor cycles. Fully fifty per cent of all passenger cars in China are found in Shanghai, Shanghai's total being 4,000 cars, against 1,200 in Pekin, 780 in Tientsin, 425 in Hongkong, 210 in Hangkow, 150 in Dairen and 115 in Canton.

The principal distributing centers for rubber goods are Shanghai, Tientsin, and Dairen. The Dunlop Rubber Company has its own distributing agencies, depots, and selling organization in North China. The most general way of distributing is through the medium of an import house with subagents or dealers established throughout the country. Importers are generally foreigners (non-Chinese). One American concern seems to be distributing to China from large warehouse stocks maintained in Japan. The market for tire repair materials is limited, and centers around Shanghai.

In 1922 American manufacturers exported 25,180 pounds of rubber belting to China, valued at $12,298, against 14,679 pounds of hose valued at $8,533 and 10,021 pounds of packing, valued at $6,050. The leading manufacturing industry of China is that of cotton textiles. China has about 2,666,000 spindles and 12,000 machine looms in the 60 mills now operating. Shanghai is the center of the cotton industry, and Honghow is second.

Pioneer's Sales Up

Although directors of the Pioneer Rubber Co., Willard, O., have deferred payments of dividends on the accumulative preferred stock, the company's sales, according to T. W. Beelman, president, are standing up well. Shipments for June, 1923, were the largest in the company's history, totaling $68,996, against $18,412 in June, 1922.

Form Accessory Committees

The Fall convention of the Motor and Accessory Manufacturers Association will be held in Boston, Mass., September 19-22. The local Boston committee of arrangements and the general program committee are said to be making good headway, the following members having agreed to serve on the program committee: W. O. Rutherford, M. L. Heminway, J. M. McComb, Maurice Switzer, S. W. Dorman, E. P. Chalfant, P. C. Gunion, B. M. Asch, H. W. Angevine, A. Pauli, C. A. Burrell, H. Deuster, and M. Lincoln.

REGULATION OF RUBBER BELTING IS PROPOSED

A two-day conference, regarding the standardization of specifications of materials turned out by rubber companies for use by oil concerns, was recently held in Denver, Colo.

Representatives of a number of rubber and oil companies discussed regulating the size of belts and pulleys. William Warr of the Manhattan Rubber Co. of Passaic, N. J., urged the adoption of either 10 or 12 inch belts as standard sizes to be used in connection with oil production. He also suggested that 16 inch pulleys for gas engines replace the 14 inch pulleys on all new equipment.

Standardization of products has been urged by Secretary of Commerce, Herbert Hoover, and this conference was called with the idea of eliminating waste and speeding up production. Representatives of the Dixie Oil Co., the United States Rubber Co., B. F. Goodrich Co., New York Belting and Packing Co., Gates Rubber Co., Goodyear Rubber Co., the Manhattan Rubber Co., The Standard Oil Co., and the Continental Oil Co. attended the conference. R. E. Gwynne of the Dixie Oil Co. presided.

PITTSBURG ASSOCIATION AFTER THE BARGAIN DEALER

The Greater Pittsburg Tire Dealers' Association is endeavoring to protect the consumer from being imposed upon by "bargain dealers" who willfully misrepresent their wares. An advertisement recently appeared in the McKeesport Daily News which stated that 30 x 3½ cord tires could be purchased at a certain dealer's shop for $7. A member of the Pittsburg Tire Dealers' Association notified President Manville of that fact. Mr. Manville immediately went to McKeesport, investigated the case, and found that the $7 cord tire was so poorly constructed that it could hardly be inflated without bursting. Mr. Manville called the Mayor's attention to this case, and at the same time extracted a promise from the Mayor to the effect that he would present the Baltimore Ordinance to the council. This ordinance has been most effective in curbing illegitimate dealers in Baltimore. A continuation of such efforts as the Pittsburg Tire Dealers' Association have been putting forth will soon eliminate the cheap "bargain dealer."

No Restriction in the Congo

The Belgian Congo is capable of producing unlimited quantities of rubber of a quality equal to that of the Federated Malay States and with a far more advantageous cost price, according to a press despatch. The Associated Press states that the Minister of Colonies has decided not to adopt for the Congo the system of restriction of rubber production recommended in England.

A Rubber Cement Kink

HERE is a valuable kink for the person who commonly uses rubber cement, and there are many who do. Rubber cement is becoming better known as a cement and is being used more and more every day.

One of the difficulties that has accompanied the use of rubber cement has been its stiffness—more properly termed its viscosity. Rubber cement flows very slowly, especially after it gets old and more especially when the month is January.

I have overcome this trouble by keeping my bottle(which I always keep on my desk) upside-down in a glass tumbler as shown in the sketch. Now I have my rubber cement ready for instant use at any time—no waiting for it to reach the mouth of the bottle on its long journey from the bottom of the bottle.

This selfsame method can be applied to any liquid that is viscuous and that is kept corked in a bottle or any other air-tight container.

New Castle Resumes Operations

The New Castle plant of the Seiberling Rubber Co., New Castle, Pa., resumed operations on Monday, July 23. The plant had been closed down for about two weeks while the semi-annual inventory was being taken and repairs were made.

Aetna To Build

A permit for the erection of a large addition to its plant was granted the Aetna Rubber Co. by the Cleveland building department. Actual work on the new plant will not begin until about the middle of this month. The permit calls for an expenditure of $30,000.

WHITAKER RESIGNS AS HEAD OF DU BOISE RUBBER

General M. N. Whitaker, president of the Du Boise Rubber and Tube Co., Chattanooga, Tenn., has resigned as president and director of that organization, effective July 18, 1923. J. P. Bowers of West Chester, Pa., was elected to succeed him.

Professional duties is the reason General Whitaker assigns for his resignation. "I believe," he said, "the Du Boise Rubber and Tube Co. needs a man in my place who can give the company all of his attention." He pointed out that the financial status of the company is in excellent condition. Assets as of June 30 stand at $122,701, as against liabilities of $37,260. In his letter of resignation he asserted that there are no pressing demands against the company.

Ajax's Net Totals $414,720

For the first six months, ended June 30 last, the Ajax Rubber Company reports a net profit of $414,720, against a net profit of $191,536 for the same period in 1922. Total sales for the six month period were $8,964,371, against $5,447,193 for the corresponding period last year. Balance sheet as of June 30 shows cash in bank and on hand of $888,477; accounts and notes receivable, $3,322,780; inventories, $3,584,570; accounts payable, $861,857; notes payable, $1,600,000, and total assets and liabilities, $14,978,958.

Goodrich Earns $3,006,384

The statement of B. F. Goodrich Co. for the six months ended June 30 shows net profits of $3,006,384 and a surplus after preferred dividends of $1,724,334. Among the assets cash was given as $3,731,758; inventories, $30,326,131. Notes and accounts payable amounted to $16,297,239.

Flynn Joins Goodrich

Gregory Flynn is now connected with the B. F. Goodrich Co. For a number of years Mr. Flynn was vice-president of the E. A. Cassidy Co., New York City, which at one time was a leading jobbing concern. Flynn will be in the manufacturers' sales department of the company.

Rubber Pavement Too High

Because rubber pavement costs too much the Bureau of Highways, Akron, O., has decided to abandon plans for paving a short section of a street in Akron. E. A. Kemmler, head of the bureau, said that a conference between department engineers and representatives of a rubber company would be held shortly, but also added that he expected no solution to the problem.

Fisk Slows Up

The Fisk Rubber Co., Chicopee Falls, Mass., has inaugurated a five-day schedule in place of a five and one-half day week. About 200 workers will be affected by this order.

FLETCHER BACKS HEVEA MOVEMENT

United States Senator Duncan C. Fletcher is interested in the possibilities of cultivating hevea trees in Florida for commercial purposes. At present efforts are being made to have the Department of Agriculture start an experimental station in the Southern part of Florida. Senator Fletcher is said to be backing a movement that may result in establishing experimental stations in his native state.

CHEMISTS TO MEET IN MILWAUKEE THIS FALL

The American Chemical Society will hold its Fall meeting in Milwaukee, September 10 to September 14 inclusive. All divisions and sections will meet in the Hotel Pfister. Programs have been arranged with special reference to the general interest of all members of the society.

The Cellulose Division will hold a symposium on "Waste Sulfite Liquors." The Division of Industrial and Chemical Engineering will hear papers by men of national reputation which will deal with various phases of industrial chemistry. A joint meeting will also be held with the Chemical Education Section; Dr. Edgar F. Smith will preside at this time, and papers from the viewpoint of the professor, industrial chemist and business man and dealing with chemical education will be read. Interesting papers will also be read before the Divisions of Biological, Agricultural and Food, Leather, while the Section of History of Chemistry has been promised important communications from prominent teachers and authors.

Of special interest will be the discussion of chemical reagents before the committee on Guaranteed Reagents and Standard Apparatus. The discussion is planned to be a friendly exchange of experiences, and manufacturers will be invited to explain some of their difficulties in finding out the requirements for various reagents.

C. R. McKee has been designated convention chairman; Harry B. Knowlton, convention supplies chairman; F. L. Theurer, transportation and excursion chairman; Mahlon Manson, hotel chairman; Benj. L. Salomon, entertainment chairman; Clare H. Hall, ladies entertainment chairman; Henry B. Merrill, program chairman; Wm. H. Kloppenburg, publicity chairman; F. E. Layman, finance chairman; Clare H. Hall, reception and registration chairman; and T. Harry Cochrane, convention manager.

The Rubber Division meeting, as usual, will be in the hands of Arnold H. Smith, Secretary, 7031 Sheridan Road, Chicago, Ill.

GOODYEAR'S ANNIVERSARY TO BE CELEBRATED

Fully 30,000 persons, employees, their families and friends, will be entertained by the Goodyear Tire and Rubber Co. on Labor Day, September 3, in commemoration of the company's 25th anniversary as a going concern. An elaborate program has been prepared. In the morning there will be a parade in which hundreds of persons will march, while a series of floats will depict the company's history and development. In the afternoon the Goodyear baseball nine will line up against the Canadian All Stars, while all sorts of divisional athletic contests will be held.

The program will culminate in the evening with an entertainment and dance at the Goodyear University Hall. Although the anniversary program is being held on Labor Day, the true date of the founding of the company is August 29, 1898.

Cotton Fertilizer Used

The Department of Agriculture reports that the Southern States have used 20 per cent more fertilizer for cotton purposes than last year. On the cotton acreage fully 37 per cent of the land planted to cotton has been fertilized, compared with 32 per cent last year. A number of states show larger gains, and it is clear that where fertilizer is used it is being supplied more generously than last year. An average of 260 pounds of fertilizer an acre used is shown for all cotton states, against 251 pounds in 1922.

Horsfull With N. J. Zinc

G. B. Horsfull has joined the sales force of the New Jersey Zinc Co. at New York and will travel in the eastern territory.

India Changes

The India Tire and Rubber Co., Akron, O., has recently opened a warehouse branch on Locust Street, Kansas City. George P. Colman, who was recently associated with the Dayton Tire and Rubber Co., has been appointed branch manager. The company also announces that R. M. Sanderson—a veteran rubber man who started with B. F. Goodrich Co. in 1893—has joined its organization.

Operating at Capacity

The Goodyear Tire and Rubber Co. of Canada reports that its plants at Toronto are operating on a 24-hour a day schedule. Increased sales of tires and mechanical goods are reported.

Rubber Plant Sold

The Burrell-Dugger Co., Indianapolis, Ind., manufacturer of poultry remedies recently bought the plant of the Parker Tire and Rubber Co., Allen Ave., Indianapolis, for $100,000. As soon as necessary alterations can be made the poultry concern will occupy the plant.

PRODUCTION EASES OFF DURING MID-SUMMER

(Continued from Page 341)

ated third shifts, so that at present the labor shortage in rubber works, reported in THE RUBBER AGE of June 10, is relieved.

On the other hand the Kokomo Rubber Company's plants, Indianapolis, Ind., are reported to be running at plant capacity in order to meet current tire demands. The plants of the Republic Rubber Co., Youngstown, O., are also maintaining recent operation schedules, while the La Crosse Rubber Co., La Crosse, Wis., is completing a $200,000 addition to its plant, which will increase its capacity to 30,000 pairs of rubber shoes a day. The Hood Rubber Co., Watertown, Mass., states that unfilled orders, at present, are far ahead of those on the company's books this time a year ago. Full employment, furthermore, is said to be assured to the company's 8,000 workmen. For the current year the Lee Tire and Rubber Co. estimates that output will total 491,000 tires and 543,000 tubes, against 449,429 tires and 407,569 tubes in 1922. In its recent semi-annual report The Ajax Rubber Co. states that sales for the first half of 1923 were 61 per cent greater than those covering the same period in 1922.

Even though there has been an easing off in production the Studebaker-Wulff Rubber Company, Marion, O., recently purchased the plant and property of the Liberty Tire Corp. of Carey, O., for $43,000. This will give the two plants a combined capacity of 2,000 casings and 1,000 tubes a day. At the same time the directors of the Studebaker-Wulff company authorized payment of a dividend on its 8 per cent preferred stock for the entire year of 1922. Earnings of the Lincoln Rubber Co., Barberton, O., have been large enough this year, permitting the company to cancel the $32,000 mortgage outstanding against the company's property. Orders on hand, according to President Hatfield, will enable the factory to turn out about 25,000 pairs of gloves a month for some time. Along with this comes the report that the Chilicothe Rubber Co., Chillicothe, O., is about to re-open its plants. On account of increased business the Reading Rubber Co., Allentown, Pa., has recently leased the old Town Hall building in Fleetwood and will convert it into an inner tube factory.

TESTING RUBBER HEELS AND SOLES

Just as tire manufacturers have test cars out on the road testing different types of tires, so the manufacturer of rubber heels and soles has to prove his product.

Out at the Goodyear factory, more than 100 men are constantly testing Wingfoot heels and soles. All the messenger boys for example, are testing soles and heels. The men working on repairs and maintenance of machinery and electrical equipment, who get around a great deal over the plant also help in the testing work.

The letter carriers, working out of the East Akron Post Office, near Goodyear, also wear Wingfoot soles and heels as part of the testing program.

Sheriff Sale For Stanwood

Announcement has been made that the property and plant of the Stanwood Rubber Company, Elizabeth, N. J., will be sold at public auction on August 31, 1923, in the sheriff's office in Elizabeth. Included in the equipment are: Burnham Hydraulic pumps, transformers, Spadone Vertical Bias Cutter, steel motor stand, Cameron Universal Slitting and Rewinding machine with parts, tire building stands, portable tire stands, core pullers, steam circulating fittings, fabric molds, cord air bag mold, stripping stands, Allen single tuber, Allen single tuber with insulating head and change disc, stripping bars, calenders, Gillette mixing mill, 3 HP motor, laboratory equipment, office furniture and equipment.

$600,000 Okonite Issue Out

The Okonite Company, Passaic, N. J., has issued $600,000 in 7 per cent ten-year sinking fund gold notes, dated July 1. Proceeds of the issue will be used to retire bank indebtedness and to provide additional working capital for the company. The company manufactures insulated wires and cables which are sold to railroads, electrical generating plants, cable companies, large manufacturing concerns, building contractors, etc.

GOODRICH STATEMENT SHOWS INCREASED SALES

Net income for the B. F. Goodrich Co. for the first six months of 1923 totaled $5,546,004. Sales for the first six months were $54,074,926, compared with $39,000,000 for the same period in 1922. Net profits were put at $3,006,385. The company shows current assets of $53,047,211, including $3,731,757 in cash, against current liabilities of $16,833,544. Total resources after deducting good will, trade marks, ets., were $95,048,268.

Hood's Sales Mount

For the first three months of 1923 sales of the Hood Rubber Co., Watertown, Mass., totaled $6,567,965, a gain of $800,000 over the corresponding period in 1922. Unfilled orders on the company's books are far ahead of those on the books this time last year. The company is turning out about 1,800 tires a day, while stocks of tires on hand are less than normal, sales not having been affected by the recent downward revision of prices. Sales of tires, however, constitute about one-third of Hood's business, rubber footwear and other rubber products constituting the other two-thirds. At present it is anticipated that total sales for the year will reach the $30,000,000 mark. The company is employing about 8,000 workers at present.

Rochow Heads Traveler Rubber

C. W. Albert Rochow, a prominent attorney of York, Pa., was recently elected president of the Traveler Rubber Co., Bethlehem, Pa., succeeding Guy de la Rigaudiere who resigned as president and member of the board of directors. E. E. Pollard was elected general manager. Other officers are: Victor Durand, Jr., first vice-president; Andrew Hershey, second vice-president; G. J. P. Raub, treasurer; and J. E. Green, secretary.

Combination Moving to Trenton

The Combination Rubber Manufacture Co. plans to leave Bloomfield, N. J., where it has been located for the past 12 years, and move to Trenton. The company is erecting a new building 275 x 77 feet on Mead Street, Trenton. The products of the company will continue to be Viking Tires, tubes and mechanical rubber appliances. The company at present is employing about 500 workers, some of whom will move to Trenton.

Domestic Exports of Rubber Reclaimed, Scrap and Old, from the United States by Countries, for June, 1923

	Reclaimed		Scrap and Old	
	Pounds	*Dollars*	*Pounds*	*Dollars*
Belgium	....	....	28,673	1,898
France	....	....	173,937	10,402
Germany	....	....	197,578	8,878
Greece	....	....	1,846	84
Italy	....	....	9,394	475
Netherlands	....	....	6,593	561
Spain	....	....	339,040	23,063
England	67,795	7,173	10,107	1,650
Scotland	....	....	128,950	6,099
Quebec and Ontario	474,604	57,512	282,216	7,746
Japan	3,202	300	165,560	3,567
Total	545,601	64,985	1,344,394	64,423

Shipments of Rubber Manufactures from the United States to Non-Contiguous Territories During the Month of June, 1923

	Alaska		Hawaii		Porto Rico	
	Quantity	Dollars	Quantity	Dollars	Quantity	Dollars
Boots and Shoes (Pairs)	18,635	52,984	5,270	6,878	57,940	45,117
Druggists' rubber sundries (Pounds)	729	652	1,097	1,262	1,969	1,439
Automobile tires (Number)	398	5,362	8,360	81,938	7,440	63,275
Other tires (Number)	16	166	1,615	3,355	1,708	3,491
Belting, hose and packing (Pounds)	64,794	31,232	16,051	7,112	10,665	3,480
Other rubber manufactures (Pounds)	5,955	2,870	28,094	14,522	26,571	9,778
Coated and waterproofed goods (Pounds)	31,600	19,685	4,199	2,964	4,530	3,513

RECENT IMPORT DUTIES LEVIED ON RUBBER GOODS

Brazil

The Brazilian import tariff is the same for all countries.

The "Actual" duties include 2% gold surtax and the increase due to proportion (60% of duty payable on a gold basis, but are really paid in paper at the current rate of exchange. The gold milrei is worth $0.546; in paper its par value is $0.3244⅓, but the value fluctuates widely, being quoted on July 16, 1923, at $0.104. Valuation used for customs purposes is c.i.f. value, port of entry. Only the column of "Actual" duties should be used.

Gross weight (not including weight of outer containers of rough wood) is used in the computation of the specific duties given in this circular, with the exception of "Belts, suspenders, garters, cords, ribbons "Cadarcos" and plaits:—Covered with pure or mixed silk" on which duty is calculated on the gross weight, deducting only the weight of the cardboard cases. The kilo is equivalent to 2.2046 pounds avoirdupois.

Rubber goods, irrespective of the class or number of the tariff in which they are included, shall only pay 5% of the duties applicable thereto, when manufactured from rubber of best quality and accompanied by a declaration of the manufacturer (duly legalized by the proper Brazilian consular authority) showing that they are manufactured from national rubber of the *fine Para* type and when bearing engraved thereon the words *Para Rubber Brazil* or some other equivalent inscription in the language of the country of origin. Owing to the difficulty of making the required declaration, it is not believed that any rubber manufacturer has taken advantage of this provision.

Item No.	Articles.	Rate of Duty. NOMINAL Milreis per kilo.	ACTUAL Milreis per kilo.
1033	*Manufactures of rubber, celluloid and gutta-percha, vulcanized or not:*		
	Pots and other articles for domestic use, funnels, capsules and bottles. (No. 50)	2.600	8.807
	Sticks, whips and similar articles. (No. 50)	5.000	16.939
	Tobacco pouches, tips of walking sticks and match box covers. (No. 50)	4.000	13.551
	Dolls, toys and similar articles. (Including tennis balls) (No. 50)	3.500	11.857
	Buttons of all kinds. (No. 50)	4.000	13.551
	Footwear. (No. 50)	3.000	10.163
	Machine packing. (No. 50)	1.000	3.388
	Combs, rulers and penholders. (No. 50)	4.000	13.551
	Fans. (No. 50) EACH:	3.000	10.163
	Belts, suspenders, garters, cords, ribbons ("Cadarcos") and plaits:		
	Covered with pure or mixed silk. (No. 50)	30.000	101.131
	Covered with any other material. (No. 50)	7.000	23.714
	Preparations or compositions for dentists. (No. 50)	3.200	10.841
	Bracelets, earrings, lockets and other articles of adornment. (No. 50)	10.000	33.877
	Stems and tubes for flowers. (No. 50)	7.000	23.714
	Combined with fabrics of cotton, wool or linen:		
	In the piece or in cuttings. (No. 50)	4.000	13.551
	In articles not specially mentioned. (No. 50)	7.000	23.714
	Combined with fabrics of pure or mixed silk:		
	In the piece or in cuttings. (No. 50)	7.000	23.714
	In articles not specially mentioned. (No. 50)	15.000	50.816
	Hose, threads, leaves or sheets. (No. 50)	1.200	4.065
	Door mats. (No. 50)	1.300	4.404
	Articles not specially mentioned. AD VALOREM:	50%	169.39%
ex806	Pneumatic tires for automobile truck wheels. AD VALOREM:	5%	25.34%
810	Pneumatic tires for motor cars. (*) AD VALOREM:	15%	57.35%

(*) A minimum value of 8 milreis per kilo on imports of tires is provided by the Brazilian customs rulings. Should the declared value be greater than 8 milreis per kilo, the duty shall be assessed on the larger sum. Fines are imposed where manifest evidence of under-valuation to defraud the customs is detected.

Panama

The import duties apply equally to the products of all countries.

Basis of assessing the ad valorem duty is value shown in the consular invoice. The monetary unit is the gold Balboa, equal to $1.00.

Item No.	Articles.	Rate of Duty
Class II.		
B.	Articles not otherwise specified. (Including manufactures of rubber)	15% ad valorem.

Palestine

Rubber goods are assessed a duty of 11% ad valorem from all sources, except Syria and Egypt (Syrian products, free; Egyptian, 8%). C.i.f. value port of entry is the basis for levying the ad valorem duty. A surtax of 1% ad valorem is levied on most imports, including rubber manufactures. The Egyptian gold pound is in use and is equal to $4.9431.

Syria

Rubber goods from all sources pay an import duty of 11% ad valorem, levied on market value at port of entry, except those of Palestine origin, which are free. Import duties are paid in Turkish gold pounds ($4.40) or the equivalent in other local currency.

Summary of Rubber Exports for June, and Six Months Ending with June, 1923

Compiled by the Department of Commerce

RUBBER BELTING, HOSE, PACKING, AND THREAD.

	Rubber Belting		Rubber Hose		Rubber Packing		Rubber Thread	
	Pounds	Dollars	Pounds	Dollars	Pounds	Dollars	Pounds	Dollars
June	272,623	161,964	412,713	170,193	160,808	73,220	105,648	106,135
Six months	1,749,505	944,635	2,283,613	876,930	710,079	332,318	561,670	568,631

PNEUMATIC CASINGS AND SOLID TIRES.

	Pneumatic Casings				Solid Tires			
	For automobiles		Other		Automobiles		Other	
	Number	Dollars	Number	Dollars	Number	Dollars	Pounds	Dollars
June	144,556	1,610,050	8,566	25,527	8,315	186,474	81,793	20,838
Six months	894,322	9,727,691	51,808	197,758	49,374	1,181,378	491,295	118,712

RUBBER FOOTWEAR AND SOLES AND HEELS.

	Boots		Shoes		Canvas shoes with rubber soles		Rubber soles and heels	
	Pairs	Dollars	Pairs	Dollars	Pairs	Dollars	Pounds	Dollars
June	27,883	78,263	50,871	44,026	336,133	257,727	150,308	53,774
Six months	137,088	381,688	272,296	239,285	2,452,947	1,839,603	961,865	343,739

HARD RUBBER GOODS AND DRUGGISTS' RUBBER SUNDRIES.

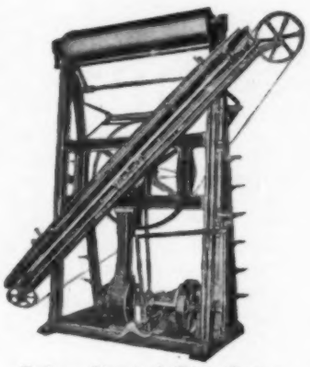
	Druggists' Rubber Sundries		Battery jars and Accessories		Other Electrical Supplies		Other hard rubber goods	
	Pounds	Dollars	Pounds	Dollars	Pounds	Dollars	Pounds	Dollars
June	66,688	64,583	11,553	3,731	15,777	9,202	65,557	45,949
Six months	427,721	412,436	257,886	82,461	224,882	72,608	302,938	229,960

PNEUMATIC TUBES, REPAIR MATERIAL, MANUFACTURES OF RUBBER NOT ELSEWHERE SPECIFIED

	Pneumatic Tubes				Tire Repair Material		Rubber Manufactures	
	Automobiles		Other					
	Number	Dollars	Number	Dollars	Pounds	Dollars	Pounds	Dollars
June	109,481	188,531	5,787	5,067	80,455	30,764	543,412	290,919
Six months	625,748	1,039,428	34,856	32,665	410,318	169,742	2,990,220	1,640,863

COATED OR WATERPROOFED FABRICS.

	Oilcloth (not floors)		Coated or Artificial Leather		Waterproofed Autocloth		Waterproofed Clothing	
	Sq. yards	Dollars	Sq. yards	Dollars	Sq. yards	Dollars	Sq. yards	Dollars
June	633,213	176,770	323,036	280,631	164,581	97,070	96,700	80,128
Six months	....	....	....	....	....	....	518,769	433,986



Bolton Vertical Bias Cutter

History of Bolton Bias Cutter

By **E. Wheeler Whitmore**

Dr. A. C. Bolton

MANUFACTURERS are constantly on the look out for mechanical devices that possess not only speed, but which are efficient as well. During the past two decades the cutting of bias fabrics for hose, tires, packings and various other rubber articles has been completely revolutionized by the introduction of cutting machines which possess the two qualifications desired—speed and efficiency.

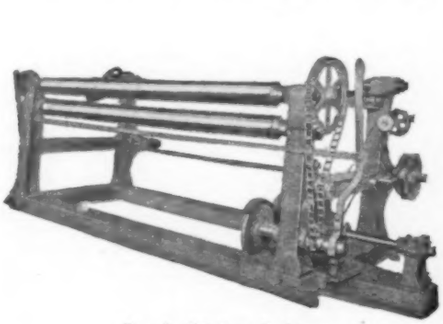
In the old days—the way verteran rubber men speak of the year 1900—there were no cutting machines. All cutting of fabrics on the bias for the manufacture of hose, tires, and other kinds of rubber goods was done on tables and by hand. By 1905 the automobile was no longer a curiosity, and consequently the demand for the pneumatic tire begun. As a matter of fact, many of the old processes of manufacture in vogue before the inception of the automobile and pneumatic tires were made obsolete by the heavy demands of this new and vast market. Many of the improvements in use today were initiated in those years when the automobile was beginning to become an important factor in the lives of the American public.

About that time Dr. A. C. Bolton, then Mechanical Engineer of the Gutta Percha & Rubber Mfg. Co., invented the Bolton Vertical Bias Cutter. It is interesting to note that Dr. Bolton as a young man studied and practiced medicine for a short time. The call of the mechanical world, however, was too strong and he deserted the one profession for the other, devoting some years to steamshipping and later being in the machine business, building various devices of his own invention, until finally settling in the rubber business from which he retired a few years ago.

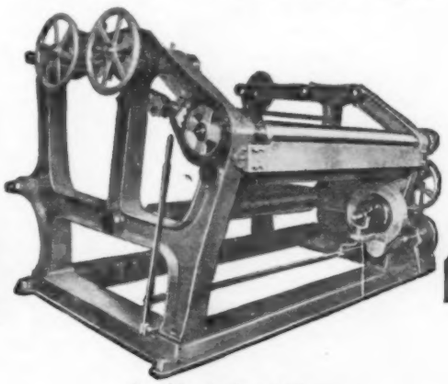
This machine was a big improvement over similar machines inasmuch as it was lighter and required very little floor space. It appealed to the rubber trade because the angle of bias could be changed anywhere from 90 degrees to 45 degrees or better. Since tire manufacturers have no standardized bias — manufacturers using various bias cutings—a demand for this machine started. Another reason why the Bolton cutter appealed to manufacturers was because of its small cutting knife. Other machines had a large heavy blade, but in the Bolton cutter it is, in many respects like a safety razor's blade, easily removable from the machine. A stock of these blades can easily be kept on hand at very little expense.

In the Bolton Vertical Bias Cutter, fabric is fed by gravity to the cutting device, which eliminates all possibility of stretching the fabric. Besides the machine has attained a high degree of efficiency and speed, and many of these cutters are now being operated in plants at a rate of from 30 to 40 cuts a minute.

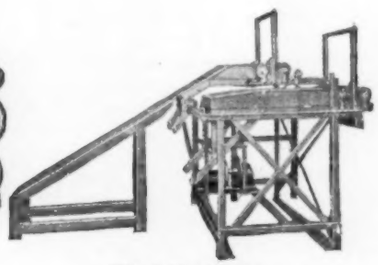
It has frequently been observed that necessity is the mother of invention. In this case it was necessary to develop equipment for taking care of the stock before and after being cut. This, therefore, lead to the invention and perfection of two machines, namely—the single and double lining stripper. As all rubber men know rubberized fabrics are usually wound in cloth liners. At first this presented a difficult problem: How could this lining be removed quickly and efficiently without retarding the speed of the bias cutter? As a result the single stripper was invented, and because there was an increasing demand for efficiency the double lining stripper was brought out later. The double stripper has one advantage over the single stripper, inasmuch as another roll of stock can be hung in place while the machine is operating. The



Single Lining Stripper



Double Lining Stripper



Wind Up Machine

(Continued on Page 356)

Father or Suggester?

Further Light Thrown on Subject of Father of American Rubber Plantation Movement

IN its July issue our gracious contemporary, The *India Rubber World*, takes exception to a statement which appeared in our May 25 issue. The extract disputed ran as follows: "John J. Watson, Jr., may be called the father of the rubber plantation movement in the United States. It was he who first suggested to the directors of the United States Rubber Company in 1908 that they investigate the possibilities of cultivating rubber in the Far East."

In commenting on this Mr. Pearson (or was it Mr. Morse?) recalled the adventures of those who, in 1901, first endeavored to grow rubber in Mexico and Central America as well as Dr. E. C. Waterhouse's first plantation in Pahang in 1906. At the same time it is interesting to learn of Col. Colt's interest in hevea planting. The *India Rubber World's* statement ends: "But to us the pioneer suggester, as far as Hevea planting goes, seems to be either Col. Colt or Dr. Waterhouse."

If it is a matter of who the "pioneer suggester" was, then it is admitted that Mr. Watson is not entitled to that honor. For that matter neither is Dr. Waterhouse nor Col. Colt. Rather the honor should go to those daring as well as enterprising individuals, who in 1901 started the unsuccessful plantations in Mexico and Central America. Those venturesome attempts undoubtedly served to suggest to the American rubber industry the possibilities of American-owned rubber plantations when properly controlled and financed.

The "Suggester"

It must also be borne in mind that the "suggester" usually receives but a passing "I thank you." The laurels generally fall about him who utilizes the experiences and suggestions of others and pushes ahead to a successful end. That is precisely what Mr. Watson did. The idea of cultivating rubber plantations was not original with Mr. Watson. In fact, he admits many conferences with Col. Colt prior to his (Col. Colt's) breakdown in 1907. It was not, however, until after this period (when Mr. Watson was handling the affairs of the United States Rubber Company) that Mr. Watson delegated Edgar B. Davis to make another trip to the Far East in order that a more detailed study of the possibilities of developing rubber plantations might be made. In 1909 Mr. Davis was given authority through Mr. Watson to start rubber plantations in Sumatra for the U. S. Rubber Company.

Mr. Watson has been kind enough to recall for us the facts in this case. They are presented below to bear out what has been stated above. Mr. Watson's statement follows:

"I had conferred with Colonel Colt many times regarding the cultivated plantation in the Far East, and he never felt that they would be the great success that they later turned out to be. The history of the early rubber planting in Ceylon had not amounted to much, and there was no great interest shown in going into the Far Eastern field.

"Colonel Colt had a complete breakdown in May, 1907, and until the Fall of 1909 was incapacitated and not able to attend to any business, during which time it largely fell to me to handle the affairs of the company.

"Edgar B. Davis, who had recently returned from a trip to the Far East, took up with me the rubber situation in the Far East, and I arranged with him to make another trip to the Far East to make an extensive study of the rubber plantation business and its opportunities. In the early part of 1909 Mr. Davis returned and made his report to the General Rubber Company, and it was upon that report that we acted and sent Mr. Davis back to the Far East with authority to start plantations. This was in 1909."

As regards Dr. E. C. Waterhouse it is true that as early as the Fall of 1906 he had already planted a few rubber trees which were later increased by additional plantings of 500 acres in both 1907 and 1908, thus antedating the U. S. Rubber Company's plantations by almost three years.

We are indebted to Fred T. P. Waterhouse, brother of Dr. Waterhouse, for the following information regarding the origin of the Pahang and Tanjong Olak plantations in Malaya:

"The first rubber plantation was started by Dr. Waterhouse and his brother-in-law George M. Harding, a Canadian, in the Federated Malay States in November, 1906, at which time a few acres were planted. Five hundred more acres were planted in 1907 and 500 in 1908, making the total slightly over 1,000 acres.

"Dr. Waterhouse had heard about rubber in Ceylon, and on his way there in 1905, he passed through the Federated Malay States. He found at that time that hevea would thrive better in the Federated Malay States than in Ceylon. Hence Dr. Waterhouse, who had subsequently been joined by his brother-in-law, George M. Harding, selected two or three tracts of land upon which hevea trees were planted. Dr. Waterhouse then went back to Honolulu, where Dr. Waterhouse, together with Fred T. P. and Albert Waterhouse incorporated the Pahang Rubber Co., Ltd. in the State of Pahang, and the Tanjong Olok Rubber Plantation, Ltd., in Johore, F. M. S. They took up the land in May, 1906, and in November, 1906 the first rubber tree was planted."

Today these two rubber plantations aggregate slightly over 2,000 acres, a small plantation when compared with the 58,000 planted acres of the U. S. Rubber Company and other plantations in the Far East.

These facts are, therefore, brought to light: The most successful of American rubber plantations is that owned by the U. S. Rubber Company in Sumatra—a project made possible through the energy and foresight of Mr. Watson. The first in point of time, though considerably smaller and less successful from a production standpoint, was the development started late in 1906 by Dr. Waterhouse.

Time vs. Size

If time is used as a basis for granting the title, "Father of the American Plantation Movement in the United States," then Dr. Waterhouse is unquestionably entitled to the laurels. If, on the other hand, the largest and most successful plantation development is used as a basis then Mr. Watson earns full credit.

It is just a matter of viewpoint—but in our estimation "a pioneer suggester" should not be entitled to the credit which rightly belongs to those who pushed the idea and who successfully attained their objectives— Dr. Waterhouse and Mr. Watson. The greater of the two is for the reader to decide.

Book Review

PLASTICS AND MOLDED ELECTRICAL INSULATION, By Emile Hemming. The Chemical Catalog Co., 312 pages, illustrated.

This endeavor by Mr. Hemming may be called a handy reference book on the subject of plastics and molded materials. At the end of each chapter the patents covering that subject are listed. That feature of the book is unique, because it shows the chemist at a glance just what has been patented in that particular field.

To those interested primarily in rubber there are references given on pages 159-162 to rubber and rubber composition patents, while on page 217 the qualifications of some rubber compounds are briefly reviewed. The book is well indexed and contains a number of illustrations.

The Abrasion Resistance of Vulcanized Rubber[1]

By H. W. Greider

Mellon Institute of Industrial Research of the University of Pittsburgh, Pittsburgh, Pa.

NUMERICAL MEASURE OF REINFORCING ACTION OF PIGMENTS

"The question now arose as to a suitable quantitative means of assessing the toughening effect of these various pigments on compounds containing them in various amounts . . . . . The method finally chosen was developed by a consideration of the conditions governing the phenomenon of abrasive wear. "Wear" here consists in the gouging or tearing out of small masses of gum, due to impact upon the road surface.

"Now a numerical measure of impact is the work done on each little mass of rubber. *If this work can be stored up without stressing the rubber substance past its rupture point, the mass will stay in place. The less energy it can so absorb, the easier it will be torn from its moorings* . . . . ."

— W. B. Weigand, M.Sc., Managing Director, Ames Holden McCready, Ltd., Montreal, Canada, in "The Canadian Chemical Journal," IV, (1920), pp. 160-170.

IT would probably be difficult to name another field of investigation which is of greater importance and interest to technologists in the rubber industry or one about which the present published data are scantier, than that of the abrasive-wear resistance of vulcanized rubber. This does not imply, however, that there has been little investigation of this property of rubber compounds, since it is the ultimate quality on which, for many purposes, the suitability and durability of the product depend. High resistance to abrasion alone, is not the compounding expert's goal, but the combination of this quality with others desirable in the finished product —high tensile strength, endurance of repeated flexing, resilience, and relatively low permanent set—determines the composition of the compound and the technic of its manufacture for such extended uses as motor-tire treads, rubber belting and rubber footwear. It must be recognized that abrasion-resistance is not a pure physical property for which absolute values may be determined, but a composite of the mechanical characteristics of the material, and further that the measured values for abrasion-resistance will vary considerably with the conditions under which they are determined. It would probably be unwise with our present knowledge of its physical properties to attempt a precise definition of the "toughness" of vulcanized rubber, but it may be considered that maximum toughness embodies an optimum combination of the qualities named above: abrasion resistance, tensile strength, endurance of flexing, resilience, and low permanent set. The concept of toughness often includes a degree of "hardness" or rigidity, together with resistance to miscellaneous stresses, torsion, impacts, tearing and cutting.

Aside from the data of North[2] on the abrasion resistance of rubber compounded with mineral rubber (blown asphalt), and the recent paper by Depew[3] in which comparisons were made between abrasion machine tests and road tests with finished tires, and between the (New Jersey Zinc Co.) abrasion machine results and the results obtained by the loose abrasive (Sproull and Evans) method, practically nothing has been published on this subject except descriptions of machines for making laboratory abrasion tests on rubber compounds. Wiegand[4], however, has studied the resilient energy capacity of compound rubber, with particular regard to the influence of compounding ingredients on this property, and has advocated its adoption as a numerical measure of the reinforcing or toughening action of pigments in vulcanized compounds (See box on this page).

Methods of Determining Resistance to Abrasion

The practical method of testing the abrasive-wear resistance of rubber products is that in which the compound in its finished form is subjected either to actual service conditions or to conditions which simulate them very closely, as in the cases where tires are run on a test car until the tread wears through or the carcass fails. Such tests can hardly be called laboratory tests, although most rubber companies make them as a regular part of their development and control work. Their inherent advantage is that they are tests of actual performance, but they often take considerable time and make the experimental work costly by consuming quantities of a valuable finished product. It is, therefore, advantageous to make preliminary and comparative tests of all compounds in which resistance to abrasive-wear is of importance, by means of a laboratory test. By comparing in this way the abrasion-resistance of the unknown compound with that of a similar compound of which the abrasion behavior in actual service has previously been determined, a very good estimate of the wear-resistance of the unknown in service, may be obtained.

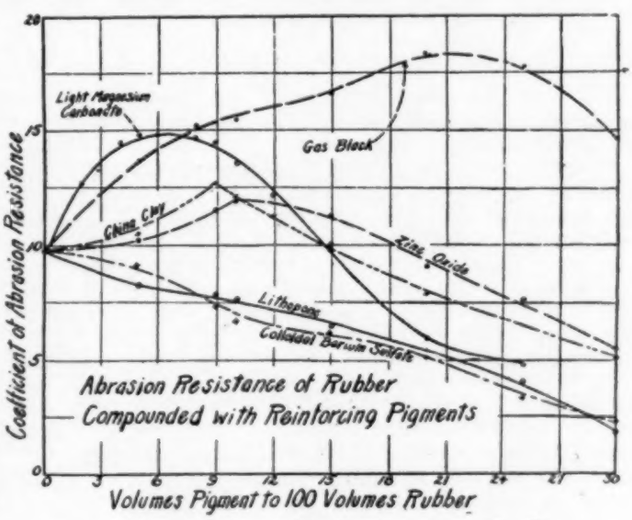


Fig. 1

Laboratory methods of studying the abrasion of rubber compounds include the following:

1. A carborundum or other abrasive wheel is rotated by a motor for a definite period of time under a fixed load, against the surface of the rubber block or strip of which the

[1]. The experimental data on which this article is based were obtained in the course of an investigation of the abrasion-resistance of rubber compounded with light magnesium carbonate, conducted for the Magnesia Association of America, at the Mellon Institute of Industrial Research.

[2]. Chem. Met. Eng., *26* (1922), 254.

[3]. Rubber Age (New York), *12* (1923), 403.

[4]. Can. Chem. J., *4* (1920), 160; J. Ind. Eng. Chem., *13* (1921), 118.

resistance is being tested. From the loss in weight and the specific gravity of the compound, the volume loss is calculated.

2. Several blocks or strips of the compound to be tested, attached by countersunk clamping devices to the periphery of a wheel, are arranged to roll under a fixed load, over an abrasive surface. From the loss in weight and the specific gravity of the compound the volume loss sustained during a stated number of revolutions under the conditions of the test, is calculated. Except for the greatly accelerated character of the abrasion this approaches an actual performance test, but clogging of the abrasive surface makes the results difficult to check. This type of machine, which was developed at the Bureau of Standards by Hart and Bawker[5] for studying the abrasive-wear of leather, combine in one test the effect of the

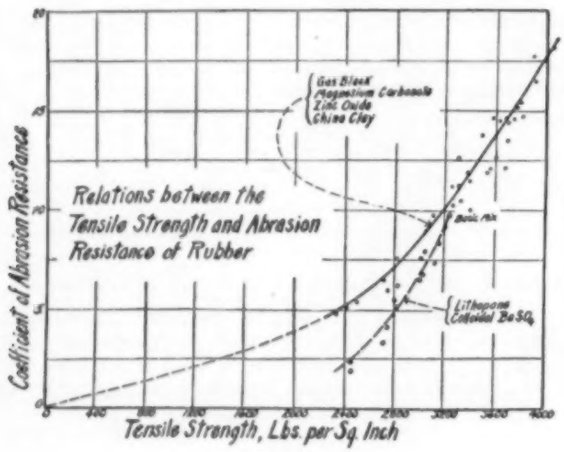


Fig. 2

abrasive and a shearing action due to driving under load over the abrasive surface.

3. Circular rings (inner diameter, 1.75 in.; outer diameter 2.25 in.), stamped by means of a steel die from a sheet of the rubber compound about 0.125 in. thick, are carefully weighed and placed between steel separator rings on a steel spool and clamped in position so that about two-thirds of the surface of each ring are exposed to the action of the abrasive. The spool is attached to a vertical spindle, and is rotated in a granular, loose, abrasive material. After a certain number of revolutions the rings are removed, carefully cleaned and weighed. The loss in weight is calculated to percentage volume loss of the compound, under the conditions established for the test. The method is that of Sproull and Evans[6], as used in the laboratories of the B. F. Goodrich Company.

4. The abrasion apparatus recently developed in the research laboratories of the New Jersey Zinc Co. and described by Depew[7], consisting essentially of a circular flat, rotating abrasive "track," against the surface of which the face of a rubber block of the compound to be tested, having an area of 4 sq. in., is held, under a load of about 0.8 lb. per sq. in. A brush and suction are provided to remove the rubber dust produced by abrasion. The abrasion volume-loss in compared with that of a "standard" compound after the same number of revolutions of the track. A crushed quartz abrasive track, using a bond of Portland cement was found to give the best results. Depew reported that this abrasion machine gave results which checked quite closely with road tests of the same tread compounds. Comparisons of the abrasive track apparatus with the method of Sproull and Evans (see above) showed that the two check qualitatively, but that the loose abrasive method gives a wider spread of points between two samples of different abrasion resistance, i.e., it is more sensitive in recording slight differences in resistance to abrasive wear.

[5]. Bur. Standards, Tech. paper *147* (1919).

[6]. Paper read in part by Dr. H. L. Fisher before the Division of Rubber Chemistry at the 62nd meeting of the American Chemical Society, New York, N. Y., Sept. 3 to 7, 1921; Am. Soc. Testing Materials, *preprint*, June, 1923.

Object of the Investigation

It was the purpose of this experimental study to investigate the abrasion resistance of vulcanized rubber, particularly with respect to the effect of various commonly used reinforcing pigments in enhancing this property. The pigments selected for this study included zinc oxide, gas black, light magnesium carbonate, china clay, and colloidal barium sulphate—all of which are considered to be "reinforcing" pigments—and, for comparison purposes, lithopone, which is usually regarded as a physically inert filler. It was desired, also, in this investigation to establish, if possible, whether there is a definite relation, as postulated by Wiegand (See box on first page), between the resilient energy[8] (work) capacity of rubber and its resistance to abrasive wear.

Experimental Method

Basis Mixing.

The basic mixing in which the above named pigments were compounded in varying volume proportions, to study their effects on abrasion resistance, had the following composition:

	Weight ratio	*Volume ratio*
Pale crepe rubber	50	50
Smoked sheet rubber	50	50
Zinc oxide	5	0.8
Sulphur	5	2.4
Hexamethylene tetramine	1	0.8

At the selected optimum cure (slightly on the under-cure side and somewhat below the tensile maximum) this compound had a tensile strength of 3230 lb. per sq. in. and a total resilient energy capacity of 440 ft. lb. per cu. in.

Physical Tests:

The usual physical tests—tensile strength, ultimate elongation, "hardness" (durometer) total resilient energy capacity, and rigidity (stiffness)—were made, following approved methods, upon all the samples. Rigidity values were obtained by measurement of the tensile stress required to produce 300 per cent elongation. Vogt[7] has suggested the slope of the line representing rigidity values for successive increments of filler, as a measure of the reinforcing effect of the pigment used.

Abrasion Tests:

The method used was that of Sproull and Evans[6] with such modifications as were necessitated by the fact that no "standard" or comparison compound was available. The test consisted of 100,000 revolutions, at 10,000 revolutions per hour, in contact with coarse granular carborundum (Grain C. Stock T.). The abrasion data represent for each compound the

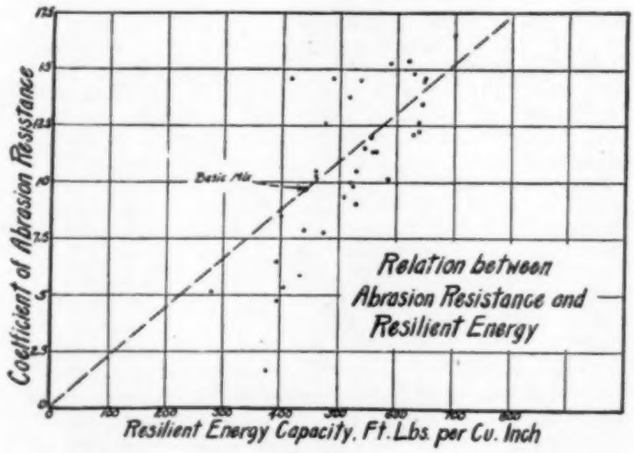


Fig. 3

average of not less than five test rings from one or more sheets vulcanized under the conditions of the optimum cure. For an investigation of this character, in which it was desired to make a comparative study of abrasion resistance and other physical properties of rubber, it seemed especially desirable that the abrasion test rings and the test strips for the determination of other physical properties should all be cut from the same sample sheet, not requiring the curing of separate blocks for the abrasion-loss determinations.

[7]. India Rubber World, *66* (1922), 349.

The abrasion data have been represented in terms of resistance to abrasive-wear, designating as the "coefficient of abrasion resistance" the reciprocal of the volume-loss which resulted from the carrying out of the test. Hence, if the compound lost 20 per cent of its volume by abrasion, it would have a coefficient of 1/0.20 or 5.0. The basic mixing used in this investigation had a "coefficient of abrasion resistance," from the average of a large number of determinations, of 9.7. It should be emphasized that the "coefficients" determined in this investigation have no absolute values and that their use is justified only as an expedient in comparing the effects of the several pigments studied and as a basis for consideration of the factors influencing abrasive-wear resistance.

Discussion of Abrasion-Resistance Data

The curves of Fig. 1 represent the abrasion-resistance data for the various volume proportions of the six pigments studied. These curves show a general similarity in trend to the curves given by the same pigments for tensile strength and for resilient energy capacity—i.e., they rise to maxima or "peaks" at approximately the same volume proportions. Furthermore, those pigments which show the highest tensile strength and resilient energy are also found to give the greatest abrasion-resistance values. It will be noted that china clay and light magnesium carbonate rise to sharper peaks, and reach their maximum at lower volume ratios than either gas black or zinc oxide, i.e., the last two pigments have a broader compounding range for maximum toughness. Maximum abrasion resistance is exhibited by gas black for proportions between 15 and 25 volumes, for light magnesium carbonate between 4 and 9 volumes, for china clay between 8 and 10 volumes and for zinc oxide between 9 and 15 volumes. No proportion of colloidal barium sulphate or lithopone gave an increase in abrasion resistance and with the larger volume increments of both these fillers the resistance to abrasion showed a very marked decrease.

The data indicates that the maximum abrasion resistance of gas black compounds (at 20 volumes) is 88 per cent greater than that of the basic mix, while at the maximum for magnesium carbonate (6 to 8 volumes) it is 52 per cent greater. For china clay the increase at the maximum (9 volumes) is 30 per cent, and for zinc oxide (at 10 volumes) the increase is 24 per cent. These values of course, apply only to the particular grades of commercial material used in this investigation and other qualities may, of course, be expected to give correspondingly better or poorer results. If these pigments are to be used in rubber *for their abrasion resistance alone*, they should evidently not be used in greater proportions than those indicated above, *if we assume that these data represent correctly the abrasion performance in service, of compounds containing these pigments.*

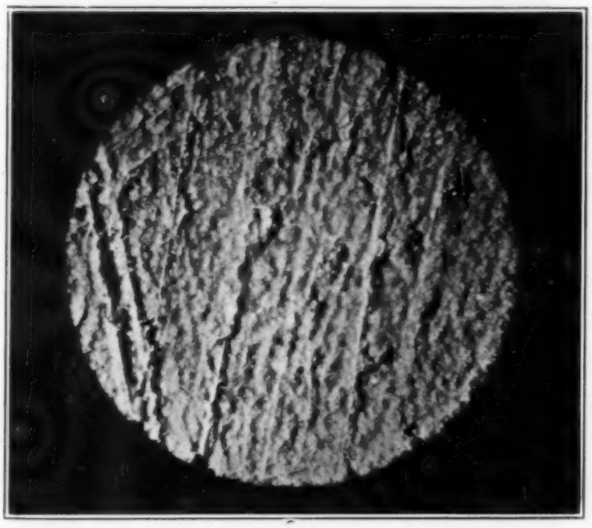


Fig. 4—Worn Tire Tread

The exceedingly low resistance to abrasion shown by rubber compounded with lithopone or colloidal barium sulphate appears to be explained by the fact barium sulphate does not have a high specific adhesion to the rubber matrix. Schippel[8] remarked in his study of the volume increase of compounded rubber under strain, that "there appears to be no cohesion whatever (or very little) between the rubber and the particles of barytes." The particles are not "wet" by the rubber, so that a film of air surrounds each particle. Green[9] showed by microscopic examination that many barytes particles in rubber are in fact surrounded by a film of gas. Although lithopone and colloidal barium sulphate are both quite finely divided, having a particle size of about the same order as zinc oxide, it would appear that when the adhesion factor in the reinforcing effect is absent, *small particle size alone is of no particular benefit*, as far as abrasion resistance is concerned.

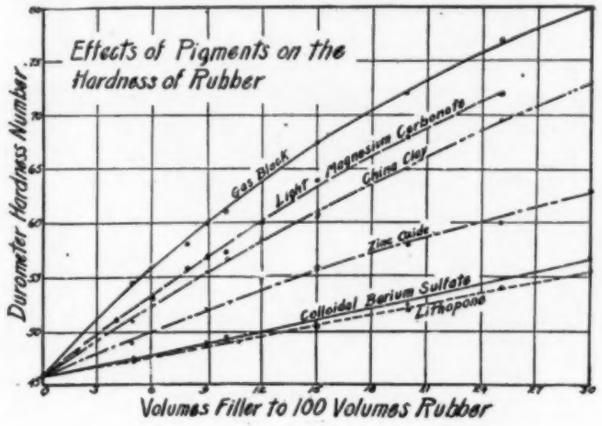


Fig. 5

Examination of Fig. 2 shows that there is a relationship, but not direct proportionality, between abrasion resistance and tensile strength, for rubber compounded with reinforcing pigments. With the physically inert (diluent) fillers, lithopone and colloidal barium sulphate, a different curve is obtained, showing a more rapid decrease of abrasion resistance with decreasing tensile strength. It will be noted that for tensile strength above 3600 lb. per sq. in. the rate of increase in abrasion resistance with increasing tensile strength is quite rapid. This immediately suggests that rubber cured with certain very rapid accelerators to give even higher tensile strength, and compounded with reinforcing pigments for the same purpose, should give exceptionally high resistance to abrasion. Extrapolation of the curve to 4800 lb. tensile strength would give a "coefficient" of about 26, representing an increase in abrasion resistance over the basic mix of about 165 per cent, as compared to the maximum of 88 per cent increase obtained in this investigation. It must not be concluded from these data, however, that if increased tensile strength were obtained by the use of ultra-accelerators alone, *without the use of reinforcing pigments*, that corresponding high resistance to abrasion would be obtained, since tensile strength is certainly not the only factor in abrasion resistance.

Comparisons of the abrasion resistance values of all the samples compounded with gas black, light magnesium carbonate, zinc oxide and china clay, with the corresponding resilient energy values, are represented in Fig. 3. Lithopone and colloidal barium sulphate were not included, because for their compounds resilient energy capacity (from tensile stress-strain data) is quite certainly no measure of abrasion resistance. From Fig. 3, there is evidently not an exact proportionality between abrasion resistance and resilient energy, although in general compounds with very high resilient energy also have high abrasion resistance. A straight line drawn through the origin and the point representing the basic mix, shows that many points fall below the line, having less abrasion resistance than would correspond to their resilient energy; these are mostly compounds containing zinc oxide or

[8] J. Ind. Eng. Chem., *12* (1920), 33.
[9] J. Ind. Eng. Chem., *13* (1921), 1029.

china clay. Some compounds, represented by points above the line, have greater abrasion resistance than would accord with their resilient energy; these compounds contain gas black or light magnesium carbonate. If then, resilient energy alone is an insufficient index of the abrasive-wear resistance of these compounds, it is pertinent to examine the other physical and mechanical qualities to determine in what other respects gas black and magnesium carbonate differ from zinc oxide and china clay in their effect on rubber.

First, they impart higher tensile strength, and second, they give greater "hardness" (or rigidity). The divergence from a direct proportionality to resilient energy seems too great in many cases to be explained entirely on the basis of the higher tensile strength, especially since the latter usually accompanies

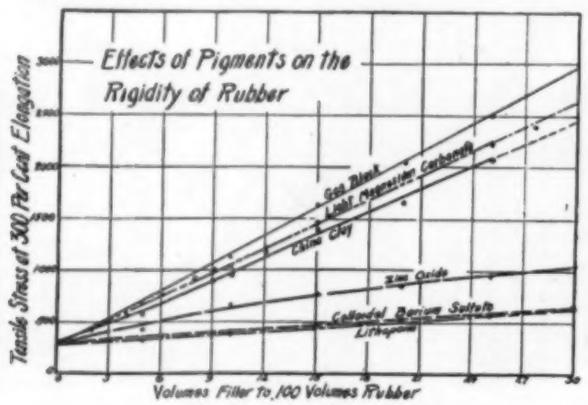


Fig. 6

high resilient energy; and this makes it appear probable that "hardness" (rigidity or stiffness) is the principal other factor.

It has been found that, (for the four reinforcing pigments studied), there is an *approximate proportionality* between the abrasion resistance for each pigment, compounded in the volume ratio at which it gives its maximum reinforcement, and the product of the resilient energy and "hardness" (rigidity) of the compound, although this does not hold true for all other compounding proportions. The abrasion resistance of the basic mix is greater than would correspond to its resilient energy—"hardness" product, suggesting that this test gives abrasion resistance values slightly too high for pure gum or lightly compounded stocks, while the values for the more rigid heavily compounded samples should be relatively somewhat greater. Since the test is carried out with a loose, granular abrasive, the effect of shear due to load on the rubber surface is small. Depew[9] has shown that the abrasion loss increases with the load applied to the rubber; doubtless the angle at which the rubber and the abrasive surface meet also has some influence.

Since the process of abrasion in rubber consists of the continual tearing away of small masses of rubber or of pigment particles from the principal mass, it will be appreciated that any physical characteristics of the rubber which renders this tearing away or "gonging" more difficult, will increase the abrasion resistance. When a worn rubber article—in particular a tire tread—is examined under a low magnification (50 diameters), it is observed that in addition to many relatively deep cuts and scratches the surface contains innumerable pits of irregular form (See Fig. 4), produced by the tearing out of relatively large masses of rubber; and the walls and edges of the pits present to the abrading forces many smaller masses already exposed, so that the application of a relatively small amount of energy at the proper angle against the surface of one of these small masses will cause it to be torn away. In the mechanism of the abrasion process a portion of the surface must be cut or penetrated before any of the rubber can be gonged away—i.e., if the surface had such perfect elasticity or such great "hardness" (rigidity) that it could not be easily penetrated or cut by the opposing abrasive surface, but absorbed the impact without failure at any point, there would be no abrasion. Since it is in resisting penetration (indentation) or cutting that "hardness" plays its part, it is not difficult to understand how it can be a factor in abrasion resistance.

The term "hardness," as applied to metals, concrete, stone and other engineering materials, lacks precise definition, and there are several methods of measuring hardness of these materials, none of which give directly comparable results. Nevertheless, it is generally recognized that soft materials are less resistance to abrasion than materials of similar composition, but greater hardness. It is, therefore, not entirely clear why hardness or rigidity has not previously received more consideration as a factor in the "toughness" of rubber. Depew[9] has pointed out only quite recently, that there are two types of compounded tire treads, one type in which abrasion resistance is due chiefly to the hardness of the stock, and the other in which the toughness of the rubber is chiefly responsible for its abrasive-wear resistance.

In this investigation the author had in mind a possible, even though not an exact, analogy between the abrasion resistance of compounded rubber and that of alloy bearing metals. It has been found by practical experience that these bearing bronzes must have considerable hardness, but a very hard bronze is too brittle and will not endure the shocks and torsion stresses set up in a bearing. A soft bronze, on the other hand, although ductile and tough with respect to shocks, wears out too quickly. This is overcome, by using an alloy combining the qualities of the two, a simple case being that of an 85:15 copper-tin bearing metal in which the greater part consists of a relatively soft, but tough matrix. In this there are dispersed a large number of very hard, brittle particles of another copper-tin alloy which has resulted from the separation of metallic crystals, in the process of cooling. These hard particles provide the wear resistance, while the soft matrix takes up the shocks. It is interesting to note, in this connection, that Bierbaum[10] has recently devised a "micro-cut" method of studying the hardness of bearing metals, using the term "hard" to express the "capacity for resisting cutting or abrasion."

Hardness or rigidity is the special characteristic of solid substances, and vulcanized rubber is a solid in the accepted sense. Rubber, however, differs from all other solid materials in its ready deformability and in its exceedingly great resilience or ability to return to its original conformation following the removal of a large deforming stress, as well as in its ability to absorb great quantities of energy and store this energy in a potential state. Hence hardness (rigidity) probably does not influence abrasion resistance in rubber to as pronounced a degree as with less elastic materials, and it is not at all certain that the "hardness" of rubber is identical with the "hardness" of these materials.

Properties of Vulcanized Products

On comparing Figs. 5 and 6 it will be observed that there are two physical properties of vulcanized compounded rubber, which instead of reaching maxima and then falling off again with successive volume additions of pigment in the compound, show practically linear increases. These properties are "hardness," as measured by a durometer, and rigidity, as determined by the stress to produce a stated elongation (300 per cent). The "hardness" and rigidity curves lie in the same order and have almost the same relative positions or "spread" for the six pigments investigated, and it must be concluded, therefore, that at least with respect to the effect of pigments in enhancing these two properties, that which is usually termed *"hardness" is substantially identical with rigidity.* It has been pointed out in a previous paper,[11] that "hardness" curves can serve as conveniently as rigidity curves to show the relative reinforcing effects of pigments, and this is confirmed by the data of Figs. 5 and 6. Both "hardness" and rigidity, although measured by different means, appear to involve the same "inner property" in the rubber network, since rubber under stress not only becomes more rigid and resistant to increasing loads, but also becomes very much harder, as measured by resistance to indentation.

The appearance of the flat surface of the test rings, compounded with gas black, light magnesium carbonate, colloidal

[10]. Chem. Met. Eng., *28* (1923), 304.
[11]. J. Ind. Eng. Chem., *14* (1922), 385.

barium sulphate, and with zinc oxide, following the abrasion loss determinations, is shown in Figs. 7 to 10, inclusive, at 50 diameters magnification. These photo-micrographs give an idea of the relative degree of wear with these four pigments. Comparison with Fig. 4 shows, that aside from the cuts in the surface, the character of the abrasion is similar to that in the laboratory tests. The large number of small cuts in the surface of the worn tread suggest that in actual service hardness or rigidity may be of greater importance in resisting wear than in this test, where such cuts are almost entirely absent.

Factors Influencing Stress-Strain Relationships of Rubber

Abrasion resistance, like many other mechanical properties of rubber, seems to depend to a considerable degree upon the stress-strain characteristics of the vulcanized compound. The factors which determine the position of the stress-strain curve, its length, its degree of curvature, and its angle of inclination

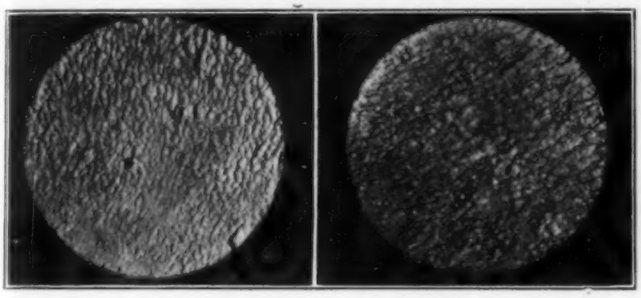


Fig. 7—20 Vol. Gas Black

Fig. 8—8 Vol. Magnesium Carbonate

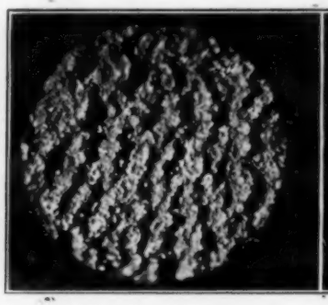


Fig. 9—10 Vol. Colloidal Barium Sulphate

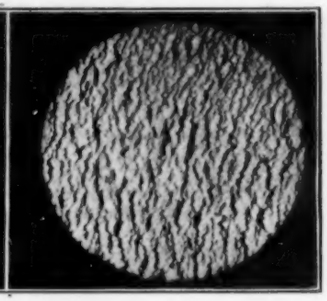


Fig. 10—10 Vol. Zinc Oxide (25 Diameters)

to the stress axis, include (1) the inherent elastic properties of the vulcanized caoutchouc colloid, (2) the kind and quality of the rubber used, (3) mechanical working of the rubber prior to vulcanization, (4) state of cure of the compound (physical and chemical), (5) aging or after-curing, (6) the specific effects of vulcanization accelerators, (7) temperature and duration of vulcanization, (8) the specific effects of various organic and inorganic compounding ingredients or reinforcing pigments, (9) the proportion by volume of compounding ingredients incorporated. Aside from the degree of vulcanization, effects of accelerators and the inherent qualities of the rubber substance, probably the most important influence on the stress-strain relationship is that of compounding ingredients or "fillers."

Wiegand[1] showed that rubber pigments may be divided into two classes, "physically inert," comprising mostly pigments of large particle size—barytes, whiting, fossel flour, pulverized magnesite, coarse clay and lithopone—and reinforcing pigments or "active" fillers, all having very small particle size—gas black, lamp black, fine (colloidal) clay, zinc oxide, light magnesium carbonate, and glue. These last named produce greatly increased "toughness," hardness (rigidity), resilient energy (work) capacity, and tensile strength, but each is specific in its effects on the physical properties of the vulcanizate.

Gas black gives the highest tensile strength, great hardness and rigidity, high resilient energy, but low elongation. Light magnesium carbonate does not produce as great hardness or rigidity nor quite as high tensile strength, but gives nearly equal resilient energy and greater extensibility. Finely divided clay imparts lower tensile, rigidity, hardness, and resilient energy than either gas black or magnesium carbonate. Zinc oxide gives greater extensibility than the others, but has much less effect on hardness and rigidity. Although not all the pigments which exhibit a reinforcing effect in rubber have an average particle below the upper limit usually specified for true colloidal particles (0.1 micron) it should be emphasized that this behavior of finely divided substances in rubber is a genuine colloid phenomenon, since in the strict sense colloidal properties involve nothing more than a full development of the surface relations between two substances, one of which is dispersed, but not dissolved in the other.

Wiegand's classification of all rubber pigments into two groups—physically inert fillers and reinforcing pigments—might be profitably extended, it seems, by a further subdivision of the reinforcing pigments into those which give great rigidity, high resilient energy and high tensile strenth—notably gas black, lamp black, magnesium carbonate, and fine china clay—and those which give less rigidity and resilient energy, but high extensibility—including zinc oxide, glue, colloidal barium sulphate and coarser clays. This division cannot, of course, be an exact one, since some pigments (notably light magnesium carbonate), combine the qualities of the two subgroups.

From the standpoint of the preparation of technical rubber products, assuming the correct (accelerated) cure with respect to tensile strength and aging qualities, it is evident that the modification of the natural stress-strain relations by the use of reinforcing pigments in appropriate amounts, is the principal device at our command for determining the position of the stress-strain curve.

Compounding Rubber for High Resilient Energy

From the discussion of the data above it becomes evident that if a rubber compound is to have the maximum resistance to abrasion it should combine three properties—(1) high tensile strength, (2) high resilient energy capacity, and (3) sufficient hardness (or rigidity). High tensile strength may be obtained by the use of a high grade accelerated mixing, compounded with correct proportions of suitable reinforcing pigments. The necessary rigidity may also be obtained by the use of reinforcing pigments in sufficient amounts. Resilient energy capacity is determined by the area between the stress-strain curve and the elongation axis. For any given tensile strength and elongation the curve which will give the *greatest area* (excluding the possibility that the curve might develop an upward concavity) is the diagonal of that area. Such a curve might be designated as the "ideal" relationship from the standpoint of resilient energy capacity. *High tensile strength is not accompanied by very high resilient energy unless the curve also has high ultimate elongation.* Therefore, high resilient energy capacity requires the combination in one compound of high tensile strength, relatively high ultimate elongation, and at least moderate rigidity (a long, relatively flat, stress-strain curve). Since this can be accomplished only to a limited degree *with any one reinforcing pigment alone*, the logical solution seems to be the use of combinations of reinforcing pigments of the two classes discussed above, so as to combine high tensile strength, rigidity and *extensibility*. There is nothing new in the idea of using combinations of fillers in rubber to obtain the desired physical properties, since this has long been common practice in the compounding art, but to this author's knowledge it had not previously been suggested that the combination of reinforcing pigments does more than give an *average* of the physical properties which would be obtained with the same pigments used separately in the same total proportions. Twiss[13] has

[13]. India Rubber J., *65* (1923), 697.

suggested, very recently, that the pigments used in rubber have a mutual beneficial effect on their dispersion in the compound and considers that the customary association of zinc oxide and gas black in high grade compounds may unconsciously be based on such an effect.

"Principles of Compounding" for High Abrasion Resistance

Having in mind the preceding discussion of means of obtaining high resilient energy it is suggested that the following may be tentatively adopted as "compounding principles," for the preparation of vulcanized rubber of high abrasion resistance.

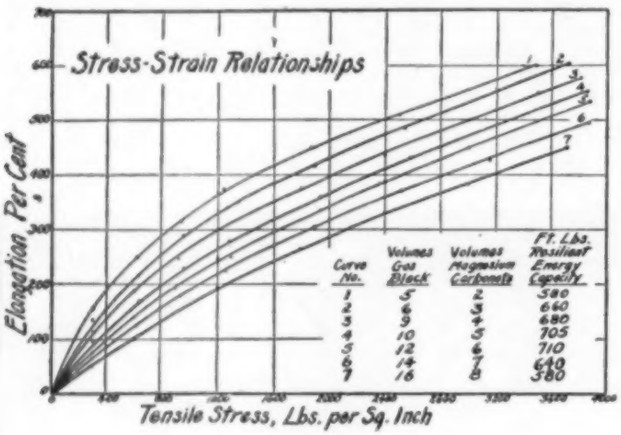

Stress-Strain Relationships
Elongation, Per Cent
Tensile Stress, Lbs. per Sq. Inch
Curve No. | Volumes Gas Black | Volumes Magnesium Carbonate | Ft. Lbs. Resilient Energy Capacity
1 5 2 580
2 6 3 640
3 9 4 680
4 10 5 705
5 12 6 710
6 14 7 640
7 16 8 380

Fig. 11

1. The use of a high-grade, accelerated basic mix, cured to give the highest tensile consistent with satisfactory aging qualities.

2. The use in appropriate amounts of combinations of the two types of reinforcing pigments—(a) a pigment which gives great rigidity with high tensile strength and resilient energy capacity, and (b) a pigment which gives high extensibility; it should also give some increase in tensile strength and resilient energy.

3. These pigments to be combined in the compound in such proportions that the product of resilient energy and "hardness" (rigidity) is a maximum.

4. Avoidance of the use of more than very limited proportions of pigments which do not give an *increase* in tensile strength and resilient energy capacity.

Which combination of pigments can be used to greatest advantage will evidently depend upon the abrasion results obtained and upon such practical considerations as the specific gravity of the compound, volume cost, heat conductivity, hysteresis loss, endurance of flexing, permanent set, and the ease of compounding and handling in the manufacturing operations.

"Some Compounds of High Abrasion Resistance"

A series of compounds containing varying proportions of gas black and light magnesium carbonate in the volume ratio of 2 to 1 as reinforcing pigments, was prepared, in accordance with the "compounding principles" set forth above. All the compounds had relatively high tensile strength, several of them had exceptionally high resilient energy, and most of them had relatively flat stress-strain curves and high rigidity (See Fig. 11). These compounds showed the high abrasion resistance which it was anticipated they would have, and this abrasion resistance was in every case considerably greater than that calculated from the data for the same proportions of the two pigments used alone, which apparently lends some support to the previously advanced postulations regarding the modification of the stress-strain relationships by the use of combinations of reinforcing pigments. For these compounds the increase in abrasion resistance above that of the basic mix was within reasonable limits of accuracy, proportional to the product of resilient energy and the "hardness" number.

It seems improbable from the aspects of the data thus far obtained, that the product of resilient energy and hardness (rigidity) would be found a satisfactory direct index of "toughness" for rubber compounded with inert fillers, oils, rubber substitute, or plastic substances, such as mineral rubber, although this certainly merits further investigation. Since high resilient energy requires a combination of high strength, moderate rigidity and relatively high elongation, this quantity may probably serve as the best *single* index of the quality of rubber compounded with reinforcing pigments.

Thermal Changes During Vulcanization

An interesting article was published, in the *Journal of Industrial and Engineering Chemistry*, 1923, volume 15, pages 255 to 258, on the subject of the thermal changes that take place during the vulcanization of rubber. Small samples (5 grams each) of mixtures of rubber and sulphur were vulcanized at various temperatures, and the self-heating was recorded by means of a thermo-couple. During vulcanization at 151 degrees C the temperature did not rise above this figure, but at 161, 172 and 176 degrees C the heat liberated during the vulcanization process caused the temperature to rise to maxima of 163, 178 and 203 degrees C. respectively. The higher the proportion of sulphur and hence the greater the rapidity of the vulcanization process, the greater the excess temperature registered inside the rubber mass when the vulcanizing bath was kept at a fixed temperature. The presence of artificial organic vulcanization accelerators also had the effect of increasing the temperature rise, while when the rubber was extracted first with acetone, the residual mass was vulcanized at a retarded rate and the temperature rise was less.

Electro-Viscous Effects of Rubber Solutions

The changes that take place in the viscosity of rubber solutions in benzol brought about by the addition of various compounds is the subject of an article published in the *Rec. Trav. Chim.*, 1923, volume 42, pages 317-331. Benzoic acid, acetic acid, mercuric chloride, ammonia, hydrochloric acid and sulphurous acid were the chemicals added to the benze solution. The acids investigated all discharge the rubber sol, and the viscosity decreases immediately in the presence of extremely small concentrations. The addition of ammonia on the other hand increases the viscosity of the solution. There may be an important functional arrangement between the viscosity of the rubber solution and other properties of the rubber. The value of the viscosity test is discussed fully.

Vulcanization Accelerators

The large German dyestuff concern Bayer & Co. has developed a number of accelerators. These have been discussed in an article, which apppeared in the *Gummi Zeitung*, 1923, volume 37, pages 440 to 442. The Bayer accelerators include aldehyde ammonia (Vulkacite A), piperidine piperidyl thiocarbamate (more correctly piperidine piperidyl thioformate) (Vulkacite B), diphenylguanidine (Vulkacite D), hexamethylenetetramine (Vulkacite H) and thiocarbanilide. The proportion used (calculated on the rubber) should be one per cent for the three first named, while one and one half per cent and from two to four per cent should be used respectively for the last two.

Zinc oxide has a strong activating effect on all these accelerators, with the exception of the diphenylguanidine. For thiocarbanilide the proportion of zinc oxide may be varied to good effect from a minimum of three to four times the weight of the accelerators up to 50 per cent or even more calculated on the rubber. When using such accelerators a reduced proportion of sulphur to rubber is desirable. With the piperidine compound and zinc oxide the proportion of sulphur should be between one and two per cent.

Cold Water Hose and Matting Specifications

(Continued from our last issue)

Proposed Tentative Specifications for Wrapped Cold Water Hose

1. These specifications cover hose for use in conveying cold water for other than public or private fire department use.

I. Manufacture

2. The hose shall consist of:
(*a*) An inner rubber tube;
(*b*) Reinforcement of plies of cotton duck;
(*c*) An outer rubber cover.

3. The rubber tube shall be smooth, uniform in quality and thickness and free from injurious defects.

4. (*a*) The reinforcement shall consist of plies of cotton duck cut on a bias of approximately 45 deg., and applied evenly and firmly over the tube with not less than a ½-in. lap, not sewed. The number of plies shall be as follows:

Inside Diameter of Hose, in.	Number of Plies
½, ¾	3
1, 1¼, 1½, 2, 2¼	4
2½ to 4	5

The plies of duck shall be well frictioned on both sides with a rubber compound which shall firmly join the plies to the rubber tube and cover and to each other.

(*b*) The duck shall be evenly woven from high grade cotton and shall be free from mechanical defects.

(*c*) The reinforcement shall be sufficiently strong to enable the hose to successfully withstand the hydrostatic pressure test and yet at the same time be soft and pliable.

5. The rubber cover shall be uniform in quality and thickness, and be free from injurious defects.

II. Physical Properties and Tests

6. The tests necessary to determine the physical properties prescribed in the following sections shall be made in accordance with the Tentative Methods of Testing Rubber Products (Serial Designation: D 15-22 T) of the American Society for Testing Materials.[1]

7. A sample 36 in. in length shall be cut from each lot of 500 ft. or fraction thereof of each size of hose.

8. (*a*) In the case of hose 1 in. or less in diameter, the test specimens shall be cut longitudinally from the sample of the hose; in the case of hose over 1 in. in diameter, the test specimens shall be cut transversely.

(*b*) The tensile strength shall be not less than 600 lb. per sq. in. for the tube and 450 lb. per sq. in. for the cover.

(*c*) The elongation at the breaking load shall be such that the original 2-in. gage length of the test specimens shall stretch to not less than 8 in. in the case of the tube and 6 in. in the case of the cover.

(*d*) The set or permanent elongation following a stretch from 2 in. to 6 in. in the case of the tube and from 2 in. to 4 in. in the case of the cover shall not exceed 25 per cent.

9. The adhesion plies shall be such that a weight of 15 lb. will not cause separation at a rate greater than 1 in. per minute. The adhesion between the cover and the plies, and also between the tube and the plies shall be such that a weight of 12 lb. will not cause separation at a rate greater than 1 in. per minute.

[1]Criticisms of these Tentative Specifications are solicited and should be directed to Mr. C. B. Martin, Secretary of Committee D-11 on Rubber Products, Room 850, 466 Lexington Ave., New York City.

10. The remainder of the 36-in. sample after all other test specimens have been cut therefrom shall withstand a hydrostatic pressure test as follows:

Inside Diameter of Hose, in.	Test Pressure, lb. per sq. in.
½, ¾	450
1, 1¼, 1½,	350
2, 2¼, 2½	300
3, 3½ and 4	250

III. Standard Sizes and Dimensions

11. Unless otherwise specified, the hose shall be furnished in 50-ft. lengths. The ends of each length shall be uncapped and without fittings.

12. The minimum thickness for the tube of all sizes of hose shall be 0.062 in. The minimum thickness for the cover for ½ and ¾-in. hose shall be 0.031 in. and for all other sizes of hose, the minimum thickness for the cover shall be 0.047 in.

[1]*Proceedings*, Am. Soc. Testing Mats., Vol. 22, Part I, p. 947 (1922).

13. The inside diameter shall not vary more than ±1/64 in. from that specified for ½ and ¾-in. hose, nor more than ±1/32 in. from that specified for all other sizes.

IV. Marking

14. Each length of hose 25 ft. or over in length shall have a brand inlaid in the rubber cover in three places: namely, approximately in the center and approxmately 5 ft. from each end. Each length of less than 25 ft. shall have a brand inlaid approximately in the center. The brand shall show the name of the manufacturer, the kind and size of hose, the month and year of manufacture, the trade name of the hose, and the legend "Wrapped Cold Water, ... lb., A.S.T.M. Specifications." The letters and figures shall be ¼ in. high, 1/32 in. in relief and shall be clear and distinct.

V. Inspection and Rejection

15. (*a*) The manufacturer shall notify the purchaser sufficiently in advance of the completion of the hose to permit of arrangement for inspection.

(*b*) The manufacturer shall afford the inspector representing the purchaser, without charge, all reasonable facilities to satisfy him that the hose is being furnished in accordance with these specifications. All tests and inspection shall be made at the place of manufacture prior to shipment, unless otherwise specified, and shall be so conducted as not to interfere unnecessarily with the operation of the works.

(*c*) The purchaser may make the tests to govern the acceptance or rejection of the hose in his own laboratory or elsewhere. But such tests shall be made within 60 days after date of shipment and at the expense of the purchaser.

16. (*a*) Any length which fails to meet any of the requirements of these specifications shall be rejected.

(*b*) In the case of failure to pass any one of the tests specified in Sections 8, 9 and 10, the entire lot of hose represented by the sample, or samples, subjected to these tests shall be rejected.

17. Samples of rejected hose shall be preserved for two weeks from the date of the test report. In case of dissatisfaction with the results of the test, the manufacturer may make claim for a rehearing within that time.

Proposed Tentative Specifications for Rubber Matting for Use Around Electrical Apparatus or Circuits Not Exceeding 3000 Volts to Ground

1. These specifications cover rubber matting for use as a floor covering near electrical apparatus.

I. Manufacture

2. The matting shall consist of a rubber compound corrugated on one surface and backed with cotton fabric, or having one or more cotton fabric inserts, the back of the matting being finished with cloth imprint.

II. Physical Properties and Tests

(A) Mechanical

3. All the tests necessary to determine the mechanical properties specified in the following sections shall be made on the rubber exclusive of fabric and shall be made in accordance with Sections 48 to 56, inclusive, of the Tentative Methods of Testing Rubber Products (Serial Designation: D 15-22 T) of the American Society for Testing Materials.[2]

4. Not less than one sample shall be taken from each piece or roll of matting and subjected to the following tests.

5. (*a*) The tensile strength shall be not less than 700 lb. per sq. in.

(*b*) The elongation at the breaking load shall be such that the original 2-in. gage length of the test specimens shall stretch to not less than 7 in.

(*c*) The set, following a stretch from 2 in. to 5 in., shall not exceed 25 per cent.

(B) Electrical

6. All the tests necessary to determine the electrical properties specified in the following sections shall be made in accordance with the methods described in Sections 13 to 17, inclusive.

7. (*a*) The entire area of the matting as nearly as practicable shall be tested between electrodes consisting of rectangular metal sheets, having smoothly rounded edges and corners and of any convenient length, the width being such that arcing around the edges of the matting will not occur, the tests being made progressively until the entire length of the matting has been covered.

(*b*) A potential of 15,000 volts shall be applied for one minute at each position of the electrodes. The matting shall not puncture, become appreciably warm at any spot or show any sign of weakness.

8. A specimen cut from the sample and tested to failure in air between 2-in. disk electrodes with edges rounded to a radius of ¼ in., the voltage being applied at the rate specified in Section 14, shall not fail at less than 40,000 volts.

III. Dimensions

9. The thickness, unless otherwise specified, shall be not less than ¼ in. when measured over the corrugations and not less than ⅛ in. at the root of the corrugations.

[1]Criticisms of these Tentative Specifications are solicited and should be directed to Mr. C. B. Martin, Secretary of Committee D-11 on Rubber Products, Room 850, 466 Lexington Ave., New York City.

[2]*Proceedings*, Am. Soc. Testing Mats., Vol. 22, Part I, p. 947 (1922).

IV. Workmanship and Finish

10. Matting shall be free from patches, blisters, pin-holes, cracks, protuberances, embedded foreign matter or other physical defects which can be detected by thorough surface inspection.

V. Inspection and Rejection

11. The matting shall be inspected and tested within four weeks of the date of delivery.

12. (*a*) Any piece or roll of matting which fails to pass any of the requirements of these specifications shall be rejected.

(*b*) In case of failure to pass any one of the tests specified in Sections 5 and 8, the piece or roll of matting represented by the sample subjected to these tests shall be rejected.

13. The testing voltage shall be obtained from a testing equipment, no part of which has a capacity of less than ½ kva. per sq. ft. of electrode surface. In no case shall the rating of any part of the testing apparatus be less than 5 kva. The frequency of the testing voltage shall be not more than 65 cycles.

14. The potential shall be applied at a low value and gradually and steadily raised at a rate of approximately 800 to 1000 volts per second until the prescribed testing voltage is reached.

15 The test period shall be counted from the instant when the prescribed testing voltage is reached.

16. The method of regulating the testing voltage shall be one which does not distort the wave form of the testing voltage from a sine wave. Acceptable methods include:

(*a*) Field regulation of the alternator supplying the transformer;

(*b*) Induction-type regulator;

(*c*) Variable-ratio-transformer type of regulator;

(*d*) Potentiometer type of rheostatic control where the current in the portion of the potentiometer resistance in parallel with the primary of the transformer is at least five times the exciting current of the transformer.

17. The testing voltage shall be measued by one of the following methods:

(*a*) A properly calibrated electrostatic voltmeter connected directly across the matting under test.

(*b*) Any properly calibrated commercial type of alternating current voltmeter connected to the low tension side of the transformer in conjunction with the ratio of transformation of the transformer provided that the ratio is definitely known for all test conditions.

(*c*) A calibrated potential transformer with a voltmeter.

History of Bolton Bias Cutter

(Continued From Page 347)

elimination of any stoppages before the removal of linings or empty shells has speeded up operations considerably.

After these machines were established the demands of the trade naturally turned to efficient means of taking care of the stock after it had been cut. Consequently, the wind up machine was the next to be introduced to the rubber manufacturer. Up to this time there were many methods of handling the stock, but all were confined to home-made devices, usually books which at best were expensive: with books, the stock had to be handled a great many times, while labor and storage room for the books sent overhead costs up.

One of the best methods to replace books, rubber men say, is to wind up the stock. When this method is used in conjunction with the bias cutter and strippers, continual operation of the bias cutters is permitted, there being no stopping to replace books or liners. Part of the equipment of the wind up machine includes two wind up tables, which can be shifted within a fraction of a second to meet the continual demands of the bias cutter.

While one table is being used, the other is being unloaded and prepared for the next shift. This affords an efficient method for handling the stock, since it is fast, requires but little room for the storing of shells, and is also easier to convey the shells with stock from the bias cutter to various making tables. The Spadone wind up machine is said to be the latest development for taking care of the stock after it has been cut on any type of a bias cutter.

All told the developments in the rubber industry have kept pace with the times and the demands for its products.

Simple Rubber Belt Transmission Rule

A very simple belt transmission rule that does not seem to be well known is this: A four ply rubber belt running one foot per minute will safely transmit one watt of electrical energy per inch of width of belt.

Thus, if a belt one inch wide runs 5,000 feet per minute it will transmit 5,000 watts. If the belt is 10″ wide it will transmit 50,000 watts at the same speed of 5,000 feet per minute.

5,000 watts is equal to 5 kilowatts.

50,000 watts is equal to 50 kilowatts.

Should it be desired to convert the watts into horsepower, multiply the number of kilowatts by 1.34. Or multiply the number of watts by .00134.

Thus, 5 Kw. x 1.34 = 6.7 h.p., or

5,000 W. x .00134 = 6.7 h.p.

MARKETS

Cottons and Fabrics

NEW YORK, AUGUST 1, 1923

The cotton crop of 1922-1923 has passed into history and now the new crop has the prominent place in the news. The crop of 1923-1924 promises a much larger yield than was expected and the fear of famine conditions that prevailed during the period of tremendous consumption in the early spring has proved unwarranted. Toward the close of the statistical cotton season prices rapidly declined and on July 30 went into new low territory with all active positions selling below 21 cents. On March 17 this year, with trade booming and a wide spread fear of a cotton famine, spot cotton at New York reached the lofty figure of 31.30 cents. The decline of 10 cents a pound that followed was caused by curtailment, a buyers strike in the cotton world, and confidence in the new crop based on the Government's June 25 report of unprecedented acreage.

Condition Report a Surprise

The cotton market received a distinct shock on August 1 when the Government issued its report showing a condition of 67.2 per cent for the growing crop. The general sentiment was for a condition of 70 per cent or better which would have indicated a crop of 12,000,000 bales. The Government estimate is 11,516,000 bales. The unexpected showing caused prices to advance about 150 points with closing figures 119 to 138 points above the previous day, equivalent to more than $6.00 a bale.

The estimate of 67.2 per cent as of July 25 this year compares with 69.9 per cent on June 25 last; 70.8 per cent on July 25, 1922; 64.7 per cent on July 25, 1921 and an average of 72.4 per cent on July 25 for the past 10 years. The estimated production of 11,516,000 bales compares with 9,761,817 last year; 7,953,641 two years ago and 13,439,603 three years ago.

Southern Estimates Bullish

The year end statement of the New Orleans Cotton Exchange also was construed as bullish, inasmuch as to obtain the equal of last years supplies, when cotton sold between 25 and 30 cents, there must be a yield from the present crop of 12,755,000 bales. The world's carry over of American cotton was estimated to be only 2,573,000 bales against 4,879,000 bales a year ago. The total consumption of American cotton during the year ending July 31 was placed at 12,631,000 bales against 12,829,000 last year.

Deterioration in Three States

A study of the Government's report shows that the average throughout the cotton belt was brought down by the condition in Florida which is estimated as 52 per cent against the Government figure of 65 per cent for June, and also Georgia, one of the largest producing states, estimated at 48 per cent against 56 for June. There was little change in the other states except Texas with 71 per cent compared with 77 per cent in June.

Cotton prices as of July 30 on the New York Cotton Exchange when the low prices of the year prevailed, were as follows:

	Open.	High.	Low.	Close	Previous Day.
Oct.	21.16	21.34	20.82	21.25@21.29	21.14
Dec.	21.05	21.22	20.68	21.12@21.15	21.02
Jan.	20.95	21.05	20.52	20.94@20.96	20.90
Mch.	21.07	21.10	20.70	21.04@21.06	21.02
May	20.97	21.10	20.73	21.00	20.97

LONG STAPLE COTTON

A quiet market prevailed with little buying of Egyptian and American staples on the expectation of lower prices. Egyptian uppers, medium grade are quoted in the New York market at 29 to 31 cents; medium grade Saks 32 to 35 cents; Mitafifi, high grade, 30 cents; medium grade, 29½ cents; Tangris, strict middling, 30 cents. American-Egyptian are quoted as follows: ones, 36 cents; twos, 35 cents; threes, 34 cents.

Prices of extra staple cotton, strictly middling in grade and color, f.o.b. New Bedford, follow:

1 1/8	inch,	26½ to 27	cents
1 3/16	inch,	27½ to 28½	cents
1 1/4	inch,	30 to 31½	cents
1 5/16	inch,	32 cents upward.	

TIRE FABRICS

Tire manufacturers have not shown any inclination to cover their fall requirements and the undertone of the fabric market was slightly weaker. It is difficult to determine actual sale prices as with some manufacturers the poundage wanted is an important element in setting the price. The following quotations are nominal.

CORD FABRICS			
Combed Sakellarides	.68	@	.72
Combed Peeler, lb.	.58	@	.63
Carded Peeler, lb.	.52	@	.56
Combed Egyptian uppers, lb.	.62	@	.64
Carded Egyptian uppers, lb.	.58	@	.60
SQUARE WOVEN			
17½-ounce Egyptian uppers, combed, lb.	.60	@	.61
17¼-ounce Egyptian uppers, carded, lb.	.55	@	.58
17¼-ounce Sakellarides, combed, lb.	.66	@	.70
17¼-ounce Peeler, combed, lb.	.55	@	.60
17¼-ounce Peeler, carded, lb.	.50	@	.55

SHEETINGS—Trading was light and quotations easy. 40-inch, 3.75-yard, could be had at 10¼ cents. The market for 40-inch, 2.85-yard, was 13¼ cents and for 40-inch, 3.60-yard, 11¾ cents.

DUCKS—Prices continued to fall as the cotton market declined. A new low price for hose and belting duck was noted at 39½ cents a pound. Single and double filling were quiet at 20½ and 23 cents. There was no surprise in the trade at these prices after the action of the cotton market.

SHEETINGS			
40-inch 2.50-yard, yd.	.15¾	@	—
40-inch 2.85-yard, yd.	.13¼	@	—
40-inch 3.15-yard, yd.	.14½	@	—
40-inch 3.60-yard, yd.	.11¾	@	—
40-inch 3.75-yard, yd.	.10¼	@	—
40-inch 4.25-yard, yd.	.09½	@	—
DUCKS			
Belting, lb.	.39½	@	.40½
Hose, lb.	.39½	@	.40½
Enameling, lb.	.49	@	.50
Shoe Ducks, lb.	.44	@	.46
Single filling, lb.	.20½	@	.21½
Double filling, lb.	.23	@	.24
BURLAPS (Carload Lots)			
7½-ounce 40-inch	5.05	@	5.10
8 -ounce 40-inch	5.10	@	—
10 -ounce 40-inch	6.80	@	—
10½-ounce 40-inch	6.85	@	—
DRILLS			
37-inch 3.25-yard, yd.	.12¼	@	—
37-inch 2.75-yard, yd.	.14¼	@	.14½
37-inch 3.00-yard, yd.	.13½	@	—
37-inch 3.50-yard, yd.	.11½	@	—
37-inch 3.95yard, yd.	.10¼	@	—
OSNABURGS			
30-inch 7-ounce	.16	@	—
40-inch 7-ounce	.16	@	.16½

News of the Trade

Ray Manager of Pima Growers' Association

Davil L. Ray, formerly connected with the Texas Farm Bureau Cotton Association, has been elected secretary and general manager of the Arizona Pima Cotton Growers' Association, succeeding P. M. James who has resigned.

Pope F. Callaway Dead

Pope F. Callaway, merchant and cotton mill director, died at his home at La Grange, Georgia, on July 31. Mr. Callaway had been connected for years with the mercantile enterprises of Fuller E. Callaway, was a director in the Callaway Mills, Inc., and in other corporations of the Callaway organizations. In his younger days he was active in business in Atlanta, Ga., and Memphis, Tenn. He was the son of the late Rev. Abner Callaway and a brother of the late Dr. Enoch Callaway.

Chemicals and Compounding Ingredients

THE INDUSTRIAL CHEMICAL MARKET—NEW YORK, Aug. 1, 1923—Midsummer dullness ruled in all the chemical markets the last two weeks in July and the quiet in industrial chemicals was more intensified by the slowing down of the great rubber industry and the watchful waiting at the tire fabric mills. During the period there was not as much shading of prices as might have been expected in such a slow market as sellers evidently felt that prices had reached the low point and should advance, from the present levels, in the next phase of the market. The only inquiry and the only buying noted was that made necessary by the exigiencies of current business. The general feeling is that business will revive and be in good volume early in September.

ACCELERATORS

Organic

Aldehyde ammonia, crystals	lb.	$ .90	@	.95
Aniline oil, drums	lb.	.16	@	.16½
Diphenylguanidine	lb.	1.20	@	—
Excellerex,	lb.	.45	@	.50
Formaldehyde-Aniline	lb.	.52½	@	—
Hexamethylene-tetramine	lb.	.95	@	1.00
Paraphenylenediamine	lb.	1.55	@	1.60
Thiocarbanilide, kegs	lb.	.27	@	.30
Vulcocene	lb.	.35	@	—

Inorganic

Lead, sublimed blue	lb.	.09¼	@	—
Lead, white	lb.	.09¼	@	—
Litharge, domestic	lb.	10.40	@	12.09
Lime, Superfine	lb.	.02	@	.02½
Magnesia, calcined, light,	lb.	.23	@	.24
extra light	lb.	.45	@	—
heavy	lb.	.05	@	.06
Orange Mineral	lb.	.14	@	.15

COLORS

Blacks

Carbon Black	lb.	.17	@	.20
Micronex		.16	@	.18
Lamp Black	lb.	.12	@	.40
Bone "	lb.	.05½	@	.07½
Drop "	lb.	.07½	@	.10
Ivory "	lb.	.15	@	.45

Blues

Prussian	lb.	.53	@	.55
Ultramarine	lb.	.08	@	.35
Cobalt	lb.	.21	@	.26

Browns

Iron oxide	lb.	.04	@	.05½
Sienna, Italian,	lb.	.05½	@	.14¼
Umber, Turkey,	lb.	.03¾	@	.04⅝
Vandyke, domestic	lb.	.03½	@	.04

Greens

Chrome, light	lb.	.32	@	.34
medium	lb.	.35	@	.36
dark	lb.	.36	@	.45
commercial	lb.	.12	@	—

Reds

Antimony crimson, 15/17% F.S.	lb.	.36	@	.45
sulphur free	lb.	.39	@	.50
golden, 15/17% F.S.	lb.	.20	@	—
calcium and sulphur free	lb.	.40	@	—
red sulphuret 15/17% F.S.	lb.	.19½	@	—
Indian, English	lb.	.08	@	.12
Commercial		.08	@	.12
Para toner	cwt.	1.00	@	1.10
Toluidine toner	lb.	2.10	@	2.25
Venetian red	lb.	.03½	@	.06
Vermillion, quicksilver, English	lb.	1.25	@	—
domestic	lb.	.25	@	.30

Whites

Albalith	lb.	.07	@	.07½
Aluminum bronze	lb.	.55	@	.60
Azolith	lb.	.07	@	.07½
Lithopone, domestic (factory)	lb.	.07	@	.07½
Zinc Oxide—American Process				
American Horse Head special	lb.	.08½	@	.09
XX red	lb.	.08	@	.08½
American Azo: ZZZ (lead free)	lb.	.08	@	.08½
ZZ (under 5 per cent leaded)	lb.	.07¼	@	.07¾
Z (8-10 per cent leaded)	lb.	.07¼	@	.07¾
Zinc Oxide—French Process				
White seal	lb.	.12	@	.12¼
Green seal	lb.	.10¾	@	.11¼
Red seal	lb.	.09¾	@	.10¼

Yellows

Chrome, light		.19	@	.20
dark and medium	lb.	.19	@	.20
Cadmium Sulphide	lb.	1.50	@	1.75
Ocher, French	lb.	.02	@	.03
domestic	lb.	.01½	@	.02

COMPOUNDING INGREDIENTS

Aluminum flake	ton	29.00	@	—
hydrate light	lb.	.19	@	.21
Ammonia carbonate,	lb.	.09	@	.10½
Barium carbonate,	ton	68.00	@	75.00
Barium Dust	lb.	.05	@	—
Barytes southern off-color,	ton	15.00	@	20.00
Western, prime white	ton	28.00	@	—
Basofor	lb.	.04¾	@	—
Blanc fixe, dry f.o.b. works	lb.	.04	@	.04½
Carrara filler	lb.	.01½	@	.02
Chalk, precipitated, extra light	lb.	.04¼	@	.05
heavy	lb.	.03¼	@	.04
Clay, China, domestic,	ton	15.00	@	16.50
Dixie	ton	22.00	@	32.00
Blue Ridge	ton	20.00	@	30.00
Fossil flour	ton	60.00	@	—
Glues, extra white	lb.	.30	@	.40
medium white	lb.	.20	@	.26
cabinet	lb.	.18	@	.30
cabinet low grade	lb.	.16	@	.19
common bone	lb.	.08½	@	.14
Graphite flake, bbls.	lb.	.06½	@	.12
amorphous	lb.	.05	@	—
Infusorial earth, powdered	ton	60.00	@	—
bolted	ton	65.00	@	—
Liquid latex	gal.	1.30	@	—
Mica, powdered	lb.	.15	@	—
Rotten Stone (powdered)	lb.	.02½	@	.04½
Soapstone, powdered	ton	12.00	@	15.00
Starch, powdered	cwt.	3.20	@	3.22
Talc, domestic	ton	15.00	@	18.00
French	ton	20.00	@	—
French, high grade	ton	40.00	@	—
Italian	ton	47.00	@	58.00
Terra Alba	cwt.	1.85	@	2.00
Tripoli, white	lb.	.02	@	.02½
Whiting, commercial	cwt.	1.00	@	1.25
English cliffstone	cwt.	1.50	@	2.50
gilder's bolted	cwt.	1.10	@	1.25
Paris white American	cwt.	1.25	@	1.50
Quaker	ton	13.00	@	15.00
Wood pulp XXX	ton	35.00	@	—
" X	ton	25.00	@	—
Zinc Oxide— lead free	lb.	.08	@	—
5 per cent leaded		.07¼	@	.07¾
10 per cent lead sulphate	lb.	.07¼	@	.07¾
20 per cent lead sulphate	lb.	.07¼	@	.07¾
35 per cent lead sulphate	lb.	.07¼	@	.07¾

(Also see whites)

MINERAL RUBBER

Genasco (factory)	ton	50.00	@	52.00
Hard hydrocarbon	ton	33.00	@	42.00
Soft hydrocarbon	ton	30.00	@	40.00
Pioneer M.R.	ton	42.00	@	44.00
320/340 M. P. hydrocarbon (c. l. factory)	ton	45.00	@	50.00
300/310 M. P. hydrocarbon (c.l. factory)	ton	40.00	@	45.00
Syntpro, granulated, M. R. (factory)	ton	55.00	@	70.00

SOFTENERS

Acids

Acetic, 28 per cent	cwt.	3.38	@	3.63
Cresylic, 97 p.c.	gal.	1.00	@	1.15
95 p.c.	lb.	1.05	@	1.10
Muriatic, 20 degrees	cwt.	1.00	@	1.10
Nitric, 36 degrees	cwt.	4.50	@	5.00
Sulphuric, 60 degrees	ton	11.00	@	12.00
66 degrees	ton	15.00	@	16.00
Tartaric, crystals	lb.	.37¼	@	—

Alkalies

Caustic soda, 76 p.c.	cwt.	3.26	@	3.75
Soda ash, 58 p.c.	cwt.	1.95	@	2.30

Oils

Castor, No. 3, bbls.	lb.	.14	@	.15
Corn, crude, bbls.	lb.	.12⅛	@	.12¼
refined	lb.	.13	@	—
Chinawood, bbls.	lb.	.23	@	.23½
Cottonseed,		.11½	@	11.75
Glycerine, drums	lb.	.16	@	.16½
Linseed, domestic	gal.	.95	@	1.05
Palm Niger	lb.	.06⅝	@	.06⅞
Lagos	lb.	.06¾	@	.07
Peanut, domestic, crude	lb.	.15	@	—
Pine, steam distilled	gal.	.70	@	.75
Rapeseed, refined	gal.	.78	@	.80
blown	gal.	1.00	@	1.05
Rosin, first rectified	gal.	.46	@	—
second rectified	gal.	.48	@	—
Tar, commercial	gal.	.27	@	.28
Soya Bean		.12½	@	.12¾
Petroleum, standard	lb.	.06	@	.08
dark amber	lb.	.03½	@	—

Resins and Pitches

Cumar resin, hard	lb.	.09	@	.10
soft	lb.	.09	@	.10
Tar Retort	bbl.	12.00	@	—
kiln burned	bbl.	12.00	@	—
Pitch, Burgundy	lb.	.05	@	.06
coal tar	lb.	.01½	@	.02
pine tar	lb.	.03	@	—
Rosin, grade K	bbl.	6.00	@	—
Shellac, fine orange	lb.	.90	@	—

Solvents

Acetone, drums	lb.	.25	@	—
Alcohol, denatured, No. 1 bbls.	gal.	.45	@	.47
Benzol, tanks	gal.	.27	@	.32
Benzol, 90 per cent	gal.	.25	@	.30
pure	gal.	.30	@	.35
Carbon bisulphide,	lb.	.06¾	@	.07
Tetrachloride	lb.	.09	@	.10½
Dimethylaniline	lb.	.41	@	.43
Motor gasoline, steel bbls.	gal.	.21½	@	—
Naptha, V. M. & P.	gal.	.20½	@	—
Toluene		.35	@	.38
Toluol, pure	gal.	.30	@	.35
Turpentine, spirits	gal.	1.20	@	—
wood	gal.	1.00	@	—

Waxes

Beeswax	lb.	.40	@	.42
Carnauba, No. 1	lb.	.42	@	.43
Ceresin, white	lb.	.10	@	.11
Bayberry	lb.	.28	@	.33
Montan, crude	lb.	.04½	@	.05
Ozokerite, black	lb.	.18	@	—
green	lb.	.27	@	.28
Paraffine	lb.	.02¾	@	.03
Sweet wax	lb.	.10	@	.12

SUBSTITUTES

Black	lb.	.09½	@	.14
White	lb.	.10	@	.16
Brown	lb.	.10	@	.15
Brown factice	lb.	.09	@	.15
White factice	lb.	.09½	@	.16

VULCANIZING INGREDIENTS

Black hyposulphite	lb.	.38	@	—
Sulphur chloride (jugs)	lb.	.05	@	.06
" " (drums)	lb.	.05	@	.06
Sulphur flour (bbls.)	cwt.	2.75	@	3.30
(bags)	cwt.	2.50	@	2.75
Commercial		1.35	@	1.70
Superfine		2.00	@	2.40
Sulphur, 100 per cent pure,		—	@	—
Bergenp't brand (bags)	cwt.	2.50	@	2.80
(bbls.)	cwt.	2.75	@	3.05

Chemicals

Litharge—The recent price reduction has not resulted in any increase in the demand for this material and the market continues quiet with casks quoted at 10.40 cents a pound; 100 to 500 pound kegs, 14 cents; 500 to 2000 pounds, 12.60 cents; 2000 to 10,000 pounds, 12.09 cents.

Blanc Fixe—The market was quiet during the period but prices remained firm. Producers are well satisfied with the business done with the rubber trade during the year. Dry continues to be quoted at 4 to 4½ cents a pound and pulp at $50 to $55 a ton.

Barytes—There has been no advance in the price of this material although production costs continue high on account of the scarcity of crude barytes. Prime Western is quoted at 28.00 a ton, f.o.b. point of production and Southern off color $15 to $20 a ton.

Zinc Oxide—The market was inactive with prices firm. The demand from the tire manufacturers is not as brisk as it has been but heavier demands from the industry is expected in the early autumn.

French process, white seal, is quoted at 12 cents, car lots; less than car lots 12½ cents; red seal, barrels, car lots, 10 cents; less than car lots, 10¼ cents; green seal, barrels, 11 cents; less than car lots, 11¼ cents. American process, in bags, lead free, 8 cents.

Lithopone—Unlike other pigments the demand for lithopone continues to be very heavy. Production this year has been far ahead of last year and producers are still pressed to keep up with the demand. Domestic in bags is quoted at 7 cents a pound; barrels, car lots, 7 to 7¼ cents; less than car lots, 7¼ to 7½ cents.

Orange Mineral—The demand for both domestic and imported was quiet with prices unchanged. Domestic brings 14 to 15 cents a pound; French, 17 cents and English, 15 cents.

Caustic Soda—Makers have been unusually busy this summer on account of the excellent demand. Contract withdrawals have been very heavy. 76 per cent is quoted at 3.26 to 3.75, drums, at works.

Talc—There was a good demand for both domestic and imported talc and the following prices are quoted: Domestic, $15 to $18 a ton at works; French $20; high grade French, $40; Italian, $47 to $58.

Carbon Black—The market was very firm and during the two weeks there was considerable activity in delivery on contracts to the rubber trade. There were rumors in the market of new plants of large capacity for making carbon black being planned for operation in Louisiana and Texas. Prices continued at 17 to 20 cents.

Carbon Bisulphide—Demand continued very good and producers quoted 6¾ to 7 cents a pound.

Soda Ash—The summer dulness has not affected the demand for this material and prices continue very firm. Light, 58 per cent, barrels, is quoted at $1.95 to 2.30 per hundred pounds.

Scrap Rubber

NEW YORK, AUGUST 1, 1923

The low price of crude rubber, general business conditions and the inventory period, have had their effect upon the scrap rubber market, which has practically been at a stand still for the past two weeks. There has been a limited amount of buying done, and this fact seems to encourage the scrap dealers.

The fact that manufacturers of mechanical goods have been operating practically at capacity is another bright spot in the scrap rubber market, dealers claim. Dealers assert that they expect an improvement in prices of scrap rubber soon.

There was some buying of tubes, and as a result inner tubes number 1 mounted 1¼ points, quoted .04¾ @ .05¼ cents. Otherwise prices remained practically unchanged. Prices quoted at this date are:

Auto tire peelings	.01	@	.01¼
Standard White auto ton	20.00	@	25.00
Mixed auto ton	12.00	@	14.00
Bicycle tires ton	7.00	@	8.00
Clean solid truck tires	.01¼	@	.01½
Boots and shoes	.03	@	.03¼
Arctics, trimmed	.02	@	.02¼
Arctics, untrimmed	.01¼	@	.01⅝
Inner tubes, No. 1	.04¾	@	.05¼
Inner tubes, compounded	.03¼	@	.03½
Inner tubes, red	.03½	@	.04
Battery jars, clean hard rubber	.02	@	.02½
Rubber Hose	.00¾	@	.00⅞
Red packing	.01	@	.01¼
White druggist sundries	.04	@	—

Reclaimed Rubber

NEW YORK, AUGUST 1, 1923

Business conditions, as far as reclaimed rubber is concerned, are being reflected in this market. Consequently the market has remained quiet and inactive during the past two weeks, there being practically no change in quotations.

Dealers state that manufacturers are not in the market at this time, although factories are operating close to capacity. Manufacturer's orders for future business have fallen off during July, and this plus the easier prices for crude rubber has had a tendency to bear down upon the market. Should there, however, be a rise in the prices of crude rubber, dealers are confident that quotations will move upward.

Quotations of this date are as follows:

Standard Reclaims			
Floating Tube	.15	@	.15½
Friction	.21½	@	.22¼
Boots and Shoes (unwashed)	.10½	@	.11
Boots and Shoes (washed)	.12½	@	.13¼
Mechanical	.10	@	.11
Hose	.10	@	.11
Tires, truck	.08½	@	.09
Tires, auto, black	.09	@	.09½
Black (washed)	.11	@	.11½
White	.13	@	.13½
Grey	.11	@	.11½

Crude Rubber

NEW YORK, AUGUST 1, 1923

The crude rubber market during the past two weeks was nervous, quotations for ribbed smoked sheets rising from .25½ cents a pound to .28¼ cents, and then reacting to .27¼ cents. Dealers attribute the rise in prices during the latter part of July to speculators, who are said to have been endeavoring to bring about a bull market. From July 27 to date prices eased off, this being attributed to the limited demand by manufacturers.

A rumor that Firestone cut prices again had a bearish effect upon the market, although dealers assert that the rumor has been discounted. Taken collectively buyers refused increased bids that holders were asking, this refusal producing an erratic market.

Dealers state that the effect of the Stevenson Restriction Act is commencing to be felt. Stringent measures to prevent rubber bootlegging have been taken in the Far East, and exports from Malaya have fallen to 15,095 tons for May and 13,664 tons for June. London stocks likewise are being depleted, and are now said to be down to 50,335 tons. Many of the Dutch growers, however, are not co-operating with the English.

Some dealers appear to be a little pessimistic over the future outlook of the market, while on the other hand there are a number who expect prices of crude rubber to take a substantial rise during the fore-part of September. Numerous inquiries have been received by dealers from manufacturers recently, although buying has been limited.

Paras and the lower grades have received but little attention during the past fortnight. Madeira Fine remained firm throughout, quoted .27¼ @ .27½, while the other grades eased off fractionally.

Quotations of this date are as follows:

Plantations			
Ribbed Smoked Sheets	.27	@	.27¼
First Latex, spot	.27	@	.27¼
August, December	.27¾	@	.28
Amber Crepe No. 1, spot	.27	@	.27¼
Amber Crepe No. 2, spot	.26½	@	.26¾
Amber Crepe No. 3, spot	.26	@	.26⅛
Light Clean Thin Brown Crepe	.26	@	.26⅛
Commercially Clean Thin Brown Crepe	.26¾	@	.27
Specky Brown Crepe	.25¾	@	.26
Roll Brown Crepe, spot	.25¾	@	.26
Paras			
Madeira Fine	.27¼	@	.27½
Acre Fine	.26½	@	.26¾
Up-river Fine	.26½	@	.26¾
Up-river Medium	.25½	@	.25¾
Up-river Caucho Ball (shipment	.24	@	.24¼
Up-river Coarse	.23½	@	.23¾
Islands Fine	.26	@	.26¼
Islands Medium	.24	@	—
Islands Coarse	.13	@	—
Cameta	.13	@	—
Xingu Ball	.23	@	—
Tapajos Fine	.26	@	.26¼
Tapajos Medium	.23¾	@	—
Pontianac			
Prime Pressed	.13	@	.14
Plantation	.07½	@	—
Bangermassin	.08	@	—
Siak Gutta Percha	.20¾	@	—
Prime Macassar	3.00	@	—
Balata			
Surinam Sheets	.80	@	.85
Columbia Block	.60	@	.65
Venezuela Block	.70	@	.75

Rubber Patents

GRANTED JULY 10, 1923

1,461,021 Spare-Tire Cover for Automobiles. Warwick G. Bate, Newton Falls, Ohio.
1,461,193 Pneumatic Toy. Hans Larsen, Racine, Wis.
1,461,217 Punctureproof Reliner for Pneumatic Tires and Casings. David L. Lazerick, Cleveland, Ohio.
1,461,311 Demountable Rim for Tires. Lee B. Hancock, Richmond, Va.
1,461,485 Single-Tube Pneumatic Tire. William H. Kern, Jersey City, N. J.
1,461,505 Resilient Rim for Automobile Wheels. Frederick Thornton, Huntington, W. Va.
1,461,527 Rubber Apron for Carding Machines. Thomas H. Hunter and George W. Hunter, Philadelphia, Pa.
1,461,531 Method of Making Cushion-Tire Structures. Fred R. Klaus and Frank H. Meyer, Warren, Ohio.
1,461,592 Demountable Rim. Jacob K. Wilkens, Muscatine, Iowa.
1,461,616 Tire Tool. Willis W. Hileman, Jonesboro, Ill., assignor of one-half to Charles H. Bruchhauser, Anna, Ill.
1,461,675 Reclaiming Vulcanized Rubber. William Beach Pratt, Wellesley, Mass., assignor to E. H. Clapp Rubber Company, Boston, Mass., a Corporation of Massachusetts.

GRANTED JULY 17, 1923

1,461,766 Tire. Andrew J. Wiegand, Baltimore, Md.
1,461,816 Wire-Covering Machine. William E. Cook, St. George, N. Y., assignor, by mesne assignments, to The Peerless Insulated Wire and Cable Co., N. Y., a Corporation of Delaware.
1,461,817 Wire-Covering Machine. William E. Cook, St. George, N. Y., assignor to Peerless Insulated Wire & Cable Co., N. Y., a Corporation of Delaware.
1,461,823 Fountain Pen. Victor Gartner, Brooklyn, N. Y.
1,461,838 Fountain Pen. Luigi Taddeo, Cleveland, Ohio.
1,461,928 Wheel Tire. Frederick C. Miller, Chicago, Ill.
1,461,984 Tire Construction. Fred Brown, Pfeiffer, Akron, Ohio.
1,462,021 Dust Cap or the Like. Eugene V. Myers, East Orange, N. J., assignors to A. Schrader's Son, Inc., Brooklyn, N. Y.
1,462,081 Safety Device for Inflating Pneumatic Tires. Howard H. Breeden, Millville, N. J.
1,462,117 Tire and Rim Construction. Charles N. McClintock, Elwood, Ind.
1,462,194 Drying Kiln, Clifford A. Cutler, Buffalo, N. Y.
1,462,197 Machine for Cutting Tires into Transverse Sections. Erick O. Fellroth, Minneapolis, Minn., assignor of one-third to Frederick N. Hegg, and one-third to Carl I. Linskoog, both of Minneapolis, Minn.
1,462,198 Tire Gage Cutter. Erick O. Fellroth, Minneapolis, Minn., assignor of one-third to Frederick N. Hegg and one-third to Carl I. Lindskoog, both of Minneapolis, Minn.
1,462,227 Tire Valve. Walter E. Copithorn, Natick, Mass.
1,462,279 Elastic Fabric. Victor Guinzburg, New York, N. Y., assignor to I. B. Kleinert Rubber Co., New York, N. Y.
1,462,282 Fixed-Rim Construction for Disk Wheels. Louis B. Harvey, Stockton, Calif., assignor to Harvey Rim & Wheel Co., Inc., Buffalo, N. Y.
1,462,389 Garment Support. Max Sonnenfield, New York, N. Y.
1,462,391 Brake Block. Robert J. Stokes, Trenton, N. J., assignor to Thermoid Rubber Co., Hamilton Township, N. J.
1,462,394 Dust Cap. George W. Terry, Nashville, Tenn.
1,462,440 Spring Tire. Arthur E. Bauman, Akron, Ohio.
1,462,452 Method of Manufacturing Pneumatic Tires and the Like. Karl B. Kilborn and William S. Wolfe, Akron, Ohio, assignors to The Goodyear Tire & Rubber Co., Akron, Ohio.
1,462,453 Tire Construction. William G. Lerch, Akron, Ohio, assignor to The India Tire & Rubber Co., Mogadore, Ohio.
1,462,455 Tire-Rim Rack. Christian H. Larson, Guffey, Tex.

GRANTED JULY 24, 1923

1,462,517 Tire Bead and Method of Making the Same. Melvon A. Marquette, Chicopee Falls, Mass., assignor to The Fisk Rubber Company, Chicopee Falls, Mass., a Corporation of Massachusetts.
1,462,524 Tire-Stripping Apparatus. William C. Stevens, Akron, Ohio, assignor to The Firestone Tire and Rubber Company, Akron, Ohio, a Corporation of Ohio.
1,462,570 Pressure Gage. Philo M. Gelatt, La Crosse, Wis.
1,462,628 Blow-Out Patch and Tire Reenforcer for Automobile Tires and Tubes. Anton S. Thoresen and Felix E. Benoit, North Attleboro, Mass.
1,462,760 Cushion Tire. Frederick A. Krusemark, Roanoke, Va., assignor to K. F. & C. Tire & Rubber Corporation, Roanoke, Va., a Corporation of Virginia.
1,462,794 Mop Holder. Helen Kumpunen, Rye, N. Y.
1,462,837 Tire Filler. Salvatore Vitaliano, Hazleton, Pa.
1,462,858 Apparatus for the Production of Weftless Rubberized Cord Fabric. Ernest Hopkinson, New York, N. Y., and Alfred E. Jury, Rutherford, N. J.; said Jury assignor to Morgan & Wright, a Corporation of Michigan.
1,462,859 Stitching Machine for Joining Rubber. Thomas B. Huestis, Bristol, R. I., assignor to National India Rubber Company, Bristol, R. I., a Corporation of Rhode Island.
1,462,942 Pneumatic Tire. Joseph A. Rogers, New York, N. Y.
1,462,984 Tire Casing. Frank G. Schenuit, Baltimore, Md.

New Incorporations

DELAWARE

Ra-Clare Rubber Co. $20,000. Incorporators: Ray W. Breyley, C. H. Mansfield, L. E. Mansfield, C. I. Stenger and Martha R. Breyley.

Wood-Krewson Rubber Co., to deal in rubber and cotton goods. $25,000. Incorporators: J. W. Krewson, Philadelphia, Pa.; Philip H. Wood, Jr., Salem, N. J.; Harry H. Emmons, Wilmington, Delaware.

ILLINOIS

Crescent Rubber Products Co., to manufacture and deal in rubber products. Principal office, 501 E. Church street, Champaign, Illinois. Incorporators: J. R. Beuchler, Enos L. Philips and Chas. C. Howard. Representatives, Green & Palmer, Flat Iron Building, Urbana, Illinois.

MASSACHUSETTS

J. W. Richardson & Son, Inc. $25,000. Incorporators: Joseph W. Reardon, Arlington, Mass.; Alfred A. Reardon, Dorchester, Mass.; Isabelle E. Reardon, Dorchester, Mass.

The Phillips Rubber Co., to manufacture rubber goods. $50,000. Principal office, Boston, Mass. Incorporators: Oliver P. Hussey, Nashua, N. H.; E. Aubrey Murphy, Norfolk; Gladys L. Murphy, Norfolk; C. Harold Baldwin, Lynn; Hugh J. Shaw, Winthrop—all of Massachusetts.

NEW JERSEY

The Brunswick Tire Corporation, to manufacture rubber goods. $100,000. Representative S. Gross, 120 Broadway, New York City.

Yatman Rubber Corp., to manufacture rubber products. $100,000. Principal office, 267 Mt. Pleasant avenue, Newark, New Jersey.

Fisk Flap Tube Rubber Company, to manufacture tires and tubes. $50,000. Incorporators: A. F. Wendel, George Wylie and M. A. Wendel. Principal office, Trenton, New Jersey.

OHIO

Wallard Rubber Co. $20,000. Principal office, Cleveland, Ohio. Incorporators: John H. Cox and A. M. Evans.

TEXAS

Southwestern Rubber Co. $25,000. Principal office, San Antonio, Texas. Incorporators: W. G. Colton, Mrs. J. C. Colton and E. J. Stevens.

Trade Marks

JULY 10, 1923

SCHRADER—No. 171,512. A. Schrader's Sons, Inc., Brooklyn, N. Y. For pneumatic valves, parts, etc.
U WEAR on checkered background—No. 176,337. Goodyear Rubber Co., Middletown, Conn. For rubber boots and shoes and artic overshoes.
EVERITE—No. 179,708. Everite Patch Co., Toledo, Ohio. For tire repair compounds, adhesives for uniting to rubber, leather, cloth, etc., adhesive cements and rubber-mending cements, compounds and adhesives.
SCHRADER—No. 180,084. A. Schrader's Sons, Inc., Brooklyn, N. Y. For fluid pressure gages, fluid-pressure indicators, fluid-pressure regulators, and sounding leads.
SCHRADER—No. 180,243. A. Schrader's Sons, Brooklyn, N. Y. For ice bags and syringe fixtures.

JULY 17, 1923

Trade mark consists of a white disk of substantially 3/16 of an inch thick, applied on each end of a fountain pen with a black body—No. 162,073. Salz Brothers, New York City. For fountain pens.
GOL-MAR—No. 164,431. Jacob N. Gold, Philadelphia, Pa. For automobile tires and accessories.
JOHNS MANVILLE, consisting of representation of packing ring surmounted by a keystone with familiar Johns-Manville trade mark and "Service" ring packing—No. 171,540. Johns-Manville, Inc., New York City. For packing rings made of rubber and asbestos or textile fabric.
U-GLU—No. 171,555. Ira. I. Slomon, New York City. For glue products and all forms of rubber cement.
HATTIE SNOW—No. 158,895. Randles Mfg. Co., Ogdensburg, N. Y. For dresses, aprons, operating-room gowns, caps, bibs, collars, cuffs, hoods; shoes made of leather, rubber, fabric, rubber and fabric and combinations thereof.
TRU-TO-NATURE—No. 174,978. Robert J. Sadler Shoe Co., New York City. For shoes of leather, rubber, fabric or combinations for men, women and children.
A kiln setting upon black semi-circle background with words above, Drying From the Inside Out—No. 175,354. The Hunter Dry Kiln Co., Indianapolis, Ind. For dry kilns.
WABACO—No. 172,246. Warren & Bailey Co., Los Angeles, Cal. For leather, woven and rubber belting, hose, sheeting, packing and rod and piston packing.
MONARCH—No. 176,065. Godfrey L. Cabot, Inc., Boston, Mass. For carbon black.
FLEX-I-PED—No. 176,486. Lord and Taylor, New York City. For shoes of leather and rubber.
SEDAN—No. 177,951. The Brunswick-Balke-Collender Co., Wilmington, Del., and Chicago, Ill. For rubber and fabric tires.
Tire with picture of a fish extending through tire—No. 179,323. Salmon Falls Manufacturing Co., Boston, Mass. For tire fabrics in the piece.
STAG—No. 181,867. Republic Rubber Co., Youngstown, O. For solid, semi-solid, pneumatic elastic tires and inner tubes.

REGISTRATIONS NOT SUBJECT TO OPPOSITION

PETER PAN—170,685. Manhattan Photo Supply Co., New York City. For golf balls.
MERIT—170,687. Stanley Glidden Co., Inc., Boston, Mass. For pneumatic and solid tires, tubes, patches, outside tire sleeves, inside tire sleeves, rubber hose, portable tire vulcanizing outfits, and rubber gaskets.
GREATER GRIP—170,688. Teuscher & Son Machinery Supply Co., St. Louis, Mo. For automobile fan belts, particularly fabric and rubberized fabric.

JULY 24, 1923

Brunswick Sedan Cord in circular red figure, the lines and lettering appearing thereon being in white—No. 177,952. The Brunswick-Balke-Collender Co., Wilmington, Del. For rubber and fabric tires.
DAYS KERITE—No. 178,106. The Kerite Insulated Wire and Cable Co., Inc., Seymour, Conn. For insulated wire and cables.

Cotton Exports From Alexandria

Dated, Alexandria, July 6, 1923

	Receipts Alexandria Cantars	Exports in Bales to England	Continent	America	Total Exports Cantars	Stock Alexandria Cantars
This week	6,388	5,235	5,010	266	80,403	1,239,640
Same week 1922	54,831	6,615	3,901	1,550	91,415	1,820,361
" " 1921	63,177	3,229	3,166	—	47,423	2,024,276
Since 9/1/1922	6,619,948	390,294	294,555	200,439	6,712,308	—
Same time 1921	5,217,755	314,175	213,589	160,313	5,232,394	—
" " 1920	4,616,415	198,144	147,593	45,856	2,990,341	—